



United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Kentucky Natural
Resources and
Environmental Protection
Cabinet and Kentucky
Agricultural Experiment
Station

Soil Survey of Fleming County, Kentucky



How To Use This Soil Survey

General Soil Map

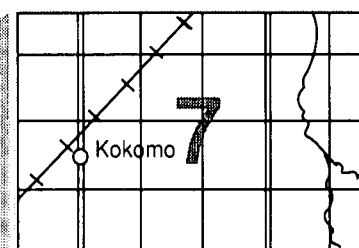
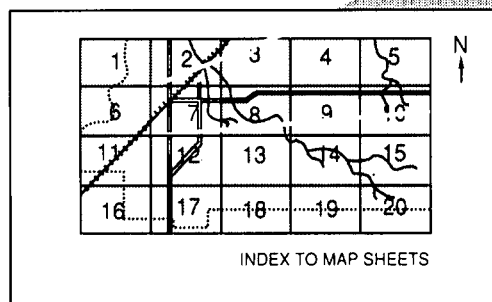
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

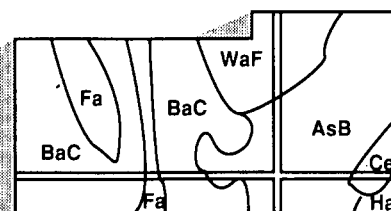
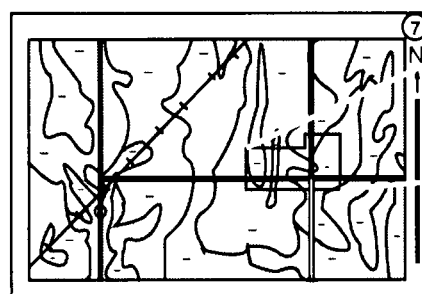
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1988. Soil names and descriptions were approved in 1989. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1989. This soil survey was made cooperatively by the Soil Conservation Service, the Kentucky Natural Resources and Environmental Protection Cabinet, and the Kentucky Agricultural Experiment Station. It is part of the technical assistance furnished to the Fleming County Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: Farmland and woodland in the Fox Valley. The barn and cropland in the foreground are in an area of Otwell silt loam, 2 to 6 percent slopes. The woodland in the background is in an area of Muse-Trappist silt loams, 20 to 55 percent slopes, eroded.

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Foreword

This soil survey contains information that can be used in land-planning programs in Fleming County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.



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Soil Survey of Fleming County, Kentucky

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Environmental Protection Cabinet

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
the Kentucky Natural Resources and Environmental Protection Cabinet and
the Kentucky Agricultural Experiment Station

FLEMING COUNTY is in the northeastern part of Kentucky (fig. 1). It is bounded on the north by Mason County, on the east by Lewis and Rowan Counties, on the south by Bath County, and on the west by Nicholas and Robertson Counties. It has an area of 224,621 acres, or about 351 square miles. In 1980, the population of the county was 12,323 and the population of Flemingsburg, the county seat, was 2,835 (18). The county is primarily rural. Farming is the main enterprise.

The county has a diverse topography. It is in three physiographic regions (4). The western part of the county is in the Hills of the Bluegrass physiographic region of Kentucky. This region is characterized by long, narrow ridgetops breaking to short, steep and very steep side slopes separated by narrow flood plains (fig. 2). The northern and central parts of the county are in the Outer Bluegrass physiographic region. This region is less hilly than the Hills of the Bluegrass and has broader ridgetops, less sloping side slopes, and moderately wide or wide flood plains. The eastern part of the county is in the Mountains and Eastern Coalfields physiographic region, which includes a very narrow band of the Knobs physiographic region. Most of this area is characterized by long, moderately wide ridgetops breaking to very steep side slopes separated by narrow or moderately wide valleys. The extreme eastern part of this area consists of long, narrow ridgetops and very steep side slopes.

The North Fork of the Licking River, which flows from

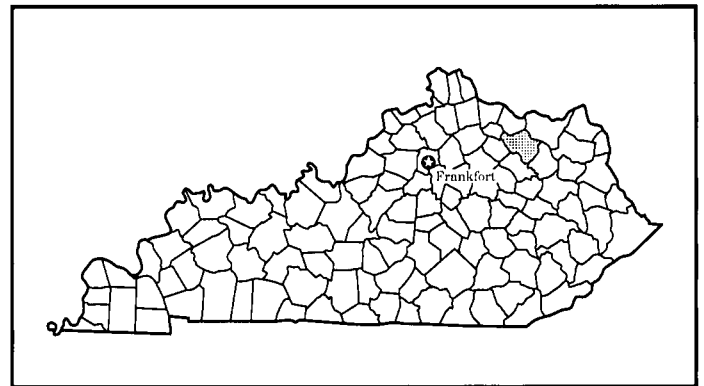


Figure 1.—Location of Fleming County in Kentucky.

east to west, forms the northern boundary of the county. Where this river flows through the Mountains and Eastern Coalfields region, the valley widens into broad flood plains and stream terraces and joins a large area of alluvial deposits on uplands. The Licking River forms the southern boundary of the county. Its valley ranges from narrow to wide. This area has old terrace deposits along the uplands near the river. The interior of the county is drained by Johnson Creek in the west, Fleming Creek in the center, and Fox Creek in the east. These three creeks all drain southward into the Licking River. Fox Creek has five flood-control structures with



Figure 2.—Typical area of the Hills of the Bluegrass physiographic region. Eden silty clay loam, 6 to 20 percent slopes, eroded, is in the pastured area in the foreground, and Eden flaggy silty clay loam, 20 to 35 percent slopes, eroded, is in the wooded areas in the background.

reservoirs averaging 25 to 35 acres in surface area.

Elevation ranges from about 600 feet at the point where Elk Creek leaves the county to about 1,430 feet on the top of a knob at the boundary between Fleming County and Rowan County, east of Plummers Mill (37, 39).

General Nature of the County

This section gives general information about Fleming County. It describes climate, farming, and settlement.

Climate

Prepared by the National Climatic Data Center, Asheville, North Carolina.

Summers are hot in the valleys of Fleming County and slightly cooler in the hills. Winters are moderately cold. Rains are fairly heavy and are well distributed throughout the year. Snow falls nearly every winter, but the snow cover usually lasts only a few days.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Flemingsburg,

Kentucky, in the period 1951 to 1978. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 33 degrees F and the average daily minimum temperature is 24 degrees. The lowest temperature on record, which occurred at Flemingsburg on January 24, 1963, is -19 degrees. In summer, the average temperature is 73 degrees and the average daily maximum temperature is 84 degrees. The highest recorded temperature, which occurred at Flemingsburg on August 3, 1964, is 100 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 43 inches. Of this, about 24 inches, or more than 55 percent, usually falls in April through September. The growing season for most crops is within this period. In 2 years out of 10, the rainfall in April through September is less than 20 inches. The heaviest 1-day rainfall during the period of record was 4.76 inches at Flemingsburg on August 27, 1951. Thunderstorms occur on about 45 days each year.

The average seasonal snowfall is about 11 inches. The greatest snow depth at any one time during the period of record was 12 inches. On an average of 5 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 65 percent of the time possible in summer and 45 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 11 miles per hour, in spring.

Farming

Fleming County is dominantly agricultural. In 1982, it had 1,295 farms, which averaged 137 acres in size (17). A total of 45,409 acres, or about 20 percent of the acreage, was used as harvested cropland.

The principal crops grown in the county in 1987 were tobacco, corn, soybeans, and winter wheat. Burley tobacco was the chief cash crop. The county ranked 12th in Kentucky in total production of burley tobacco in 1987. Corn was grown for both silage and grain. Most

of the winter wheat was grown as a winter cover crop.

The areas of hayland and pasture in the county commonly support mixtures of grasses and legumes. The principal hay crops are alfalfa, red clover, timothy, orchardgrass, and Kentucky 31 fescue. The most common pasture plants are Kentucky 31 fescue, Kentucky bluegrass, and orchardgrass. Red clover and white clover generally are grown in pasture mixtures. Fescue and orchardgrass hay generally are rolled into circular bales that are moved to storage areas and then returned to the fields for winter feeding (fig. 3).

Dairying is the leading livestock enterprise, followed by the raising of beef cattle and hogs. In 1987, Fleming County ranked third in Kentucky in total milk production. Horses, sheep, poultry, and goats also are raised in the county.

Settlement

Fleming County was formed from part of Mason County by an act of the Kentucky Legislature in 1798 (13). It was named in honor of Colonel John Fleming, who first entered the county in 1787 and eventually established Fleming Station near what is now Martha's Mills. Colonel Fleming was prominent in the early history of the county, as is indicated by the names Fleming County, Flemingsburg, and Fleming Creek. Later settlers came primarily from Virginia but also from Pennsylvania and the Carolinas. Settlement centered at first in the central and western parts of the county and later in the eastern part.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils



Figure 3.—Hay in an area of Lowell silt loam, 2 to 6 percent slopes. The steeper area in the background is Lowell silt loam, 6 to 12 percent slopes.

in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries (26).

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they

compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research (29).

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic

classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes.

Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Some of the soil boundary lines do not join with the lines in adjacent counties because of differences in the design of general soil map units and changes in the concepts of some soils.

1. Eden-Lowell

Moderately deep to very deep, well drained, very steep to gently sloping soils that have a clayey subsoil; on side slopes and ridgetops

This map unit is in the western part of the county. The landscape is characterized by long, narrow ridgetops and short side slopes separated by narrow flood plains. The major soils formed in material weathered from interbedded, calcareous shale and limestone of Ordovician age. Slopes range from 2 to 35 percent. They are dominantly 20 to 35 percent.

This unit is dissected by many small drainageways and intermittent streams, a few perennial streams, and the Licking River, which meanders along the southern boundary of the county. A few of the broader ridgetops have small sinkholes or depressions through which water drains. Farm ponds are the embankment or excavated type. Except for a few small communities,

scattered rural homes, farmsteads, roads, and power lines are the major structures. Most homes and farmsteads are on the gently sloping and sloping soils.

This unit makes up about 15 percent of the county. It is about 66 percent Eden soils, 17 percent Lowell soils, and 17 percent soils of minor extent (fig. 4).

Eden soils are moderately deep and are sloping to very steep. They are on narrow ridgetops and side slopes, generally at elevations below the Lowell soils. Typically, the surface layer is brown flaggy silty clay loam. The subsurface layer is brown and yellowish brown flaggy silty clay. The subsoil is yellowish brown flaggy clay in the upper part and light olive brown, mottled very flaggy clay in the lower part.

Lowell soils are deep or very deep and are gently sloping to moderately steep. They are on ridgetops and the upper side slopes, generally at elevations above the Eden soils. Typically, the surface layer is dark yellowish brown silt loam. The upper part of the subsoil is strong brown, dark yellowish brown, and yellowish brown silty clay loam and silty clay. The next part is yellowish brown clay. The lower part is yellowish brown, mottled clay. The substratum is olive yellow clay.

Of minor extent in this unit are Faywood, Allegheny, Nicholson, and Sandview soils on ridgetops and side slopes; Elk and Otwell soils on stream terraces; and Nolin and Boonesboro soils on flood plains and in upland drainageways and depressions.

Most areas of this unit are used as permanent pasture or as woodland. Some small areas on the broader ridgetops are used for hay or cultivated crops. Some areas on the steeper side slopes formerly were used as pasture but are now idle and are reverting to woodland or woody plants. The wooded areas support mixed hardwoods or eastern redcedar.

Most of the soils in this unit are poorly suited to farming. The gently sloping soils on the broader ridgetops and the minor soils on nearly level and gently sloping flood plains are suited to most of the cultivated crops and species of hay commonly grown in the county. The moderately steep soils are better suited to permanent pasture than to cultivated crops. The slope,

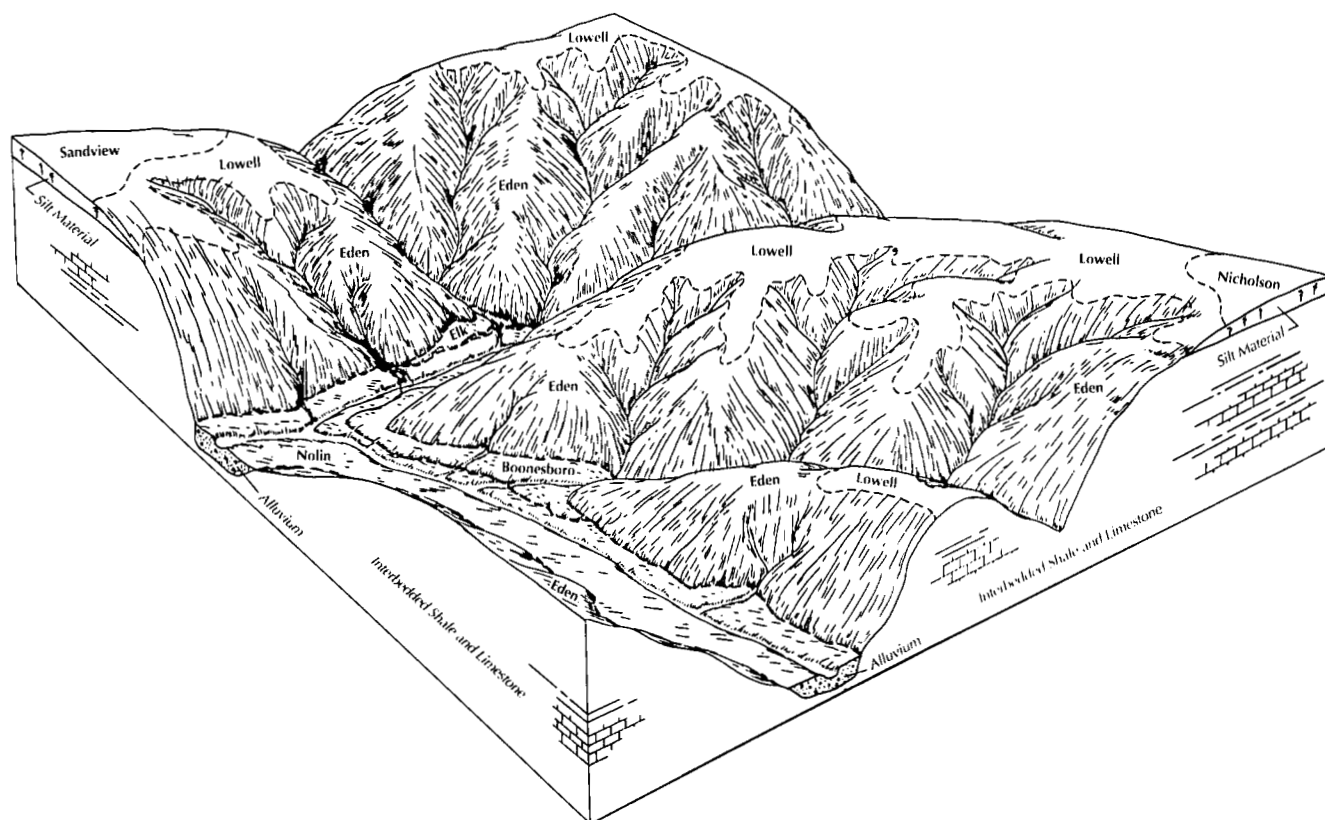


Figure 4.—Typical pattern of soils and parent material in the Eden-Lowell general soil map unit.

the depth to bedrock, the hazard of erosion, surface flagstones, and droughtiness are management concerns.

The soils in this unit are suited to woodland. The main concerns in managing the sloping to very steep areas for timber are an equipment limitation, seedling mortality, the hazard of erosion, and plant competition. Plant competition also is a management concern on the gently sloping ridgetops.

Most of the soils in this unit are poorly suited to urban uses. The gently sloping and sloping soils are suited to some urban uses. The slope, the depth to bedrock, a moderate shrink-swell potential, the clayey subsoil, and slow permeability are limitations. Low strength is a limitation on sites for local roads and streets.

2. Lowell-Faywood-Cynthiana

Very deep to shallow, well drained or somewhat excessively drained, gently sloping to very steep soils that have a clayey subsoil; on ridgetops and side slopes

This map unit is in the west-central part of the

county. The landscape is characterized by broad ridgetops and short side slopes separated by narrow and moderately wide flood plains. The major soils formed in material weathered from limestone and calcareous shale of Ordovician age. Slopes range from 2 to 35 percent.

This unit is dissected by many small drainageways and intermittent streams and by a few perennial streams. Many areas have sinkholes or depressions through which water drains. Most farm ponds are the embankment type. There are a few small lakes and two reservoirs. The city of Flemingsburg, many small communities, scattered rural homes, farmsteads, a developed road system, and power lines are the major structures. A limestone quarry and a landfill are in areas of this unit.

This unit makes up about 30 percent of the county. It is about 34 percent Lowell soils, 31 percent Faywood soils, 23 percent Cynthiana soils, and 12 percent soils of minor extent (fig. 5).

Lowell soils are deep or very deep, well drained, and gently sloping to moderately steep. They are on broad ridgetops and side slopes, generally at elevations above

the Cynthiana soils. In some areas they are intermingled with areas of the Faywood soils on sloping and moderately steep side slopes. Typically, the surface layer is dark yellowish brown silt loam. The subsoil is strong brown, dark yellowish brown, and yellowish brown silty clay loam and silty clay in the upper part and yellowish brown, mottled clay in the lower part. The substratum is olive yellow clay.

Faywood soils are moderately deep, well drained, and gently sloping to very steep. They are on ridgetops and side slopes. They generally are intermingled with areas of the Lowell soils on broad, sloping to moderately steep ridgetops and side slopes; with areas of the Cynthiana soils on narrow, sloping ridgetops; and with areas of the Cynthiana soils and limestone rock outcrop on moderately steep to very steep side slopes. Typically, the surface layer is brown silt loam. The subsoil is dark yellowish brown silty clay in the upper part and yellowish brown clay in the lower part.

Cynthiana soils are shallow, well drained or somewhat excessively drained, and sloping to very steep. They are on narrow ridgetops and side slopes.

They generally are intermingled with areas of the Faywood soils at elevations below the Lowell soils. Typically, the surface layer is brown silty clay loam. The subsoil is light olive brown flaggy clay in the upper part and light olive brown and yellowish brown flaggy silty clay in the lower part.

Of minor extent in this unit are Beasley, Fairmount, Nicholson, and Woolper soils on ridgetops and side slopes; Elk and Otwell soils on stream terraces; and Nolin and Boonesboro soils on flood plains and in upland drainageways and depressions.

Most areas of this unit are used as cropland, hayland, or pasture. The sloping to very steep areas on side slopes generally are used as pasture. Small areas of mixed hardwoods or eastern redcedar are generally on the steep and very steep side slopes.

Most of the soils in this unit are suited to farming. The gently sloping soils on ridgetops and the minor soils on nearly level and gently sloping flood plains and stream terraces are well suited to most of the cultivated crops and species of hay commonly grown in the county. The moderately steep and steep soils are suited

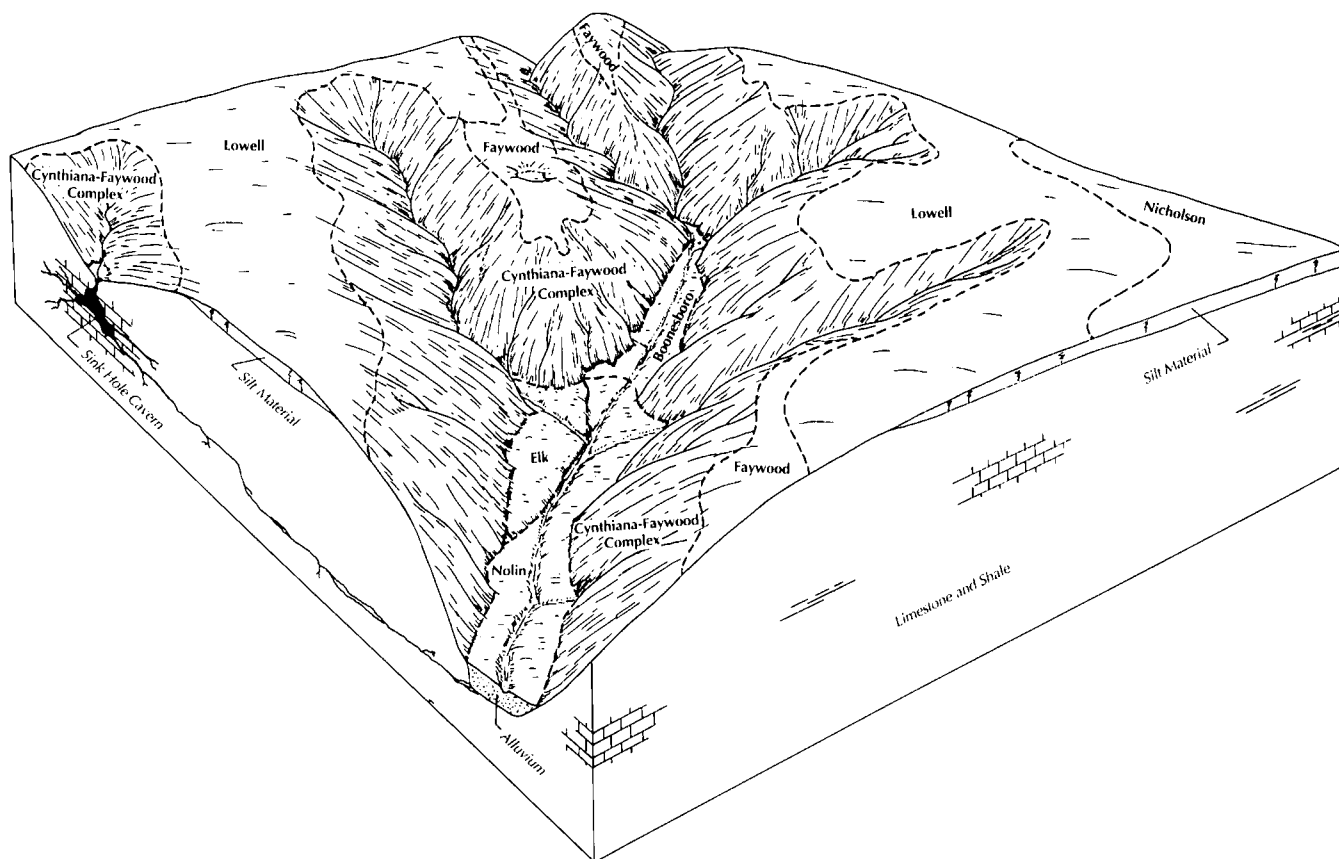


Figure 5.—Typical pattern of soils and parent material in the Lowell-Faywood-Cynthiana general soil map unit.

to hay and permanent pasture. The depth to bedrock, the hazard of erosion, the slope, droughtiness, surface flagstones, and rock outcrops are management concerns.

The soils in this unit are well suited to woodland. The main concerns in managing the sloping to very steep areas for timber are an equipment limitation, seedling mortality, the hazard of erosion, and plant competition. Plant competition also is a management concern in most of the gently sloping areas.

The gently sloping and sloping soils in this unit are suited to some urban uses, but the moderately steep to very steep soils are poorly suited. The slope, the depth to bedrock, a moderate shrink-swell potential, the clayey subsoil, and slow permeability are limitations. Low strength is a limitation on sites for local roads and streets.

3. Fairmount-Woolper-Cynthiana

Shallow to very deep, well drained or somewhat excessively drained, very steep to gently sloping soils that have a clayey subsoil; on side slopes and ridgetops

This map unit is in the south-central part of the county. The landscape is characterized by short side slopes and narrow and moderately wide ridgetops separated by narrow to wide flood plains. The major soils formed in material weathered from interbedded limestone and calcareous shale of Ordovician age and in clayey colluvium over limestone. Slopes range from 2 to 60 percent.

This unit is dissected by many small drainageways and intermittent streams, a few perennial streams, and the Licking River, which meanders along the southern border of the county. Some areas have sinkholes or depressions through which water drains. Many small excavated farm ponds are in scattered areas along the ridgetops. A few rural homes, scattered farmsteads, power lines, and roads are the major structures.

This unit makes up about 2 percent of the county. It is about 31 percent Fairmount soils, 20 percent Woolper soils, 13 percent Cynthiana soils, and 36 percent soils of minor extent.

Fairmount soils are shallow, well drained, and steep and very steep. They are on side slopes, generally at elevations below the Cynthiana soils. They are intermingled with areas of the Woolper soils. Typically, the surface layer is very dark grayish brown flaggy silty clay loam. The subsurface layer is dark brown flaggy silty clay loam. The subsoil is dark yellowish brown flaggy clay.

Woolper soils are very deep, well drained, and gently sloping, steep, and very steep. They are on low stream terraces, foot slopes, and side slopes. They are

intermingled with areas of the Fairmount soils on steep and very steep side slopes. Typically, the surface layer is dark brown silt loam. The subsurface layer is dark yellowish brown silt loam. The subsoil is strong brown silty clay loam in the upper part and dark yellowish brown silty clay and clay in the lower part. The substratum is dark yellowish brown clay.

Cynthiana soils are shallow, well drained or excessively drained, and sloping to very steep. They are on narrow ridgetops and side slopes. Typically, the surface layer is brown silty clay loam. The subsoil is light olive brown flaggy clay in the upper part and light olive brown and yellowish brown silty clay in the lower part.

Of minor extent in this unit are Faywood, Lowell, Beasley, and Eden soils on ridgetops and side slopes; Allegheny, Elk, Monongahela, and Otwell soils on stream terraces; and Boonesboro soils on flood plains and in upland drainageways.

Most areas of this unit are used as permanent pasture. The steep and very steep areas are wooded with mixed hardwoods or eastern redcedar. Some small areas of the major soils on the broader ridgetops and some small areas of the minor soils on flood plains are used as cropland or hayland.

Most of the soils in this unit are poorly suited to farming. The moderately steep and steep soils are better suited to permanent pasture than to cultivated crops. The slope, the depth to bedrock, the hazard of erosion, surface flagstones, rockiness, and droughtiness are management concerns. Some of the minor soils on gently sloping ridgetops, stream terraces, and nearly level flood plains are suited to cultivated crops and hay.

The soils in this unit are suited to woodland. The main concerns in managing the moderately steep to very steep areas for timber are an equipment limitation, seedling mortality, the hazard of erosion, and plant competition. Plant competition also is a management concern in the gently sloping areas.

The soils in this unit are poorly suited to urban uses. The slope, the depth to bedrock, a moderate shrink-swell potential, moderately slow permeability, surface flagstones, rockiness, and the clayey subsoil are limitations. Low strength is a limitation on sites for local roads and streets. Flooding is a hazard on some of the minor soils on flood plains.

4. Beasley-Shrouts-Crider

Very deep to moderately deep, well drained, gently sloping to steep soils that have a clayey or loamy subsoil; on ridgetops and side slopes

This map unit extends from north to south through the central part of the county. The landscape is

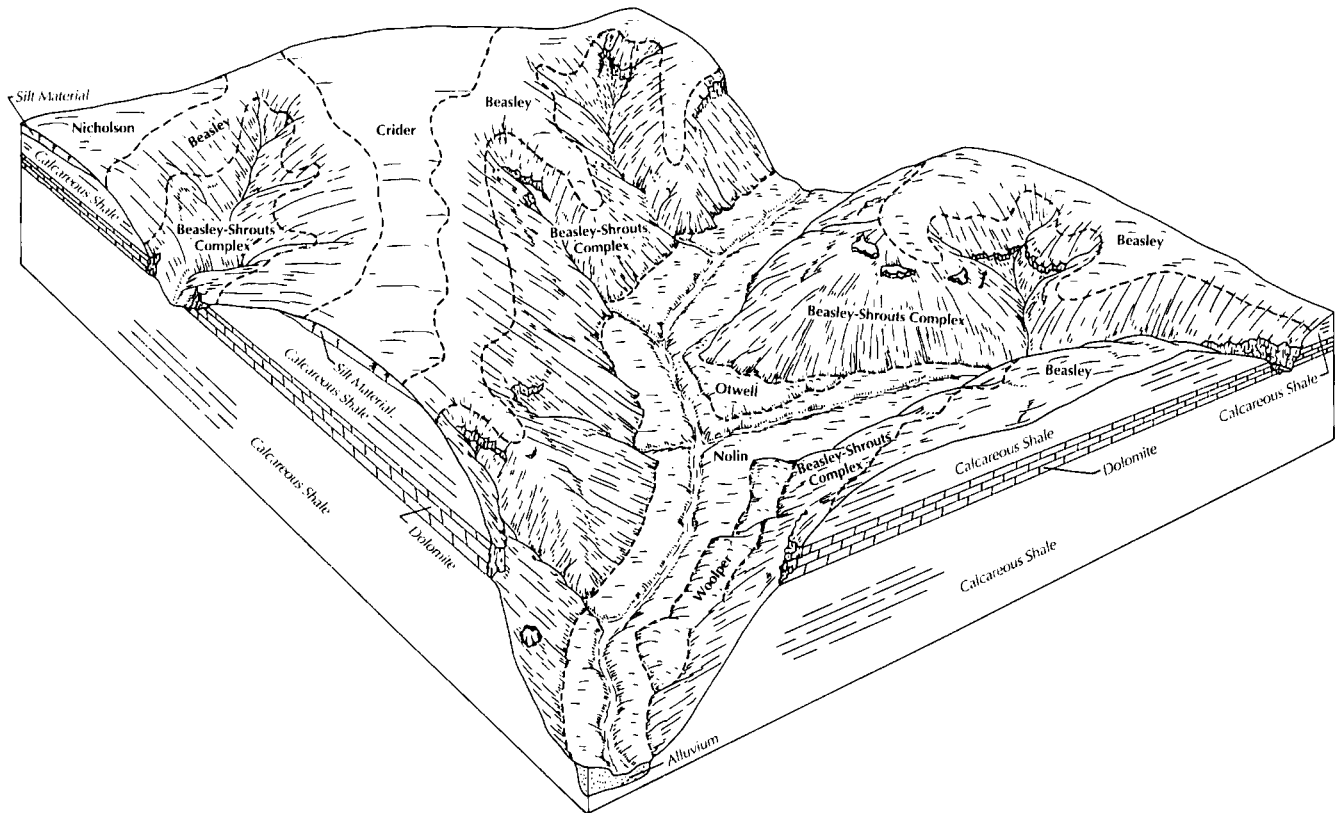


Figure 6.—Typical pattern of soils and parent material in the Beasley-Shrouts-Crider general soil map unit.

characterized by broad ridgetops and relatively long side slopes separated by moderately wide flood plains. The major soils formed in material weathered from limestone, dolomite, and calcareous shale of Silurian age. Slopes range from 2 to 30 percent.

This unit is dissected by many small drainageways, intermittent streams, and three perennial streams and is bordered on the north by the North Fork of the Licking River and on the south by the Licking River. A few small areas on the western edge of the unit have sinkholes or depressions through which water drains. There are many small excavated or embankment farm ponds, a few small lakes, and one large watershed structure. Several small communities, scattered rural homes, farmsteads, a developed road system, a major natural gas pipeline, and power lines are the major structures.

This unit makes up about 18 percent of the county. It is about 52 percent Beasley soils, 22 percent Shrouts soils, 7 percent Crider soils, and 19 percent soils of minor extent (fig. 6).

Beasley soils are deep or very deep and gently sloping to steep. They are on ridgetops and side slopes.

They are intermingled with areas of the Shrouts soils on moderately steep and steep side slopes. Typically, the surface layer is brown silt loam. The subsoil is yellowish brown silty clay and clay. The substratum is yellowish brown, light olive gray, strong brown, and reddish yellow clay.

Shrouts soils are moderately deep and gently sloping to steep. They are on ridgetops and side slopes. In some areas they are intermingled with areas of the Beasley soils on moderately steep and steep side slopes. Typically, the surface layer is very dark grayish brown silty clay. The subsoil is light olive brown, olive, and greenish gray silty clay and clay. The substratum is yellowish brown, olive, and greenish gray channery clay.

Crider soils are very deep and gently sloping and sloping. They are on ridgetops and the upper side slopes. Typically, the surface layer is dark yellowish brown silt loam. The subsoil is strong brown and yellowish red silty clay loam in the upper part, yellowish red and red silty clay in the next part, and red clay in the lower part.

Of minor extent in this unit are Allegheny, Nicholson,

Woolper, Cynthiana, and Fairmount soils on ridgetops and side slopes; Monongahela, Elk, and Otwell soils on stream terraces; and Boonesboro, Newark, and Nolin soils on flood plains and in upland drainageways and depressions.

Most areas of this unit are used as cropland, hayland, or pasture. The sloping to steep side slopes generally are used as pasture. Some areas are wooded with mixed hardwoods or eastern redcedar. These areas generally are on the moderately steep and steep side slopes.

Most of the soils in this unit are suited to farming. The gently sloping soils on ridgetops are well suited to most of the cultivated crops and species of hay commonly grown in the county. The moderately steep and steep soils are better suited to hay and permanent pasture than to cultivated crops. The depth to bedrock, the hazard of erosion, the slope, and, in some areas, rockiness are management concerns.

The soils in this unit are well suited to woodland. The main concerns in managing the sloping to steep areas for timber are an equipment limitation, seedling mortality, a severe hazard of erosion, and plant competition. Plant competition also is a management concern in the gently sloping areas. Windthrow of some pines is a hazard on the gently sloping to steep Shrouts soils.

The gently sloping and sloping soils in this unit are suited to some urban uses, but the moderately steep and steep soils are poorly suited. The slope, the depth to bedrock, a moderate shrink-swell potential, the clayey subsoil, and slow permeability are limitations. Low strength is a limitation on sites for local roads and streets.

5. Beasley-Shrouts-Lawrence

Very deep to moderately deep, well drained or somewhat poorly drained, steep to nearly level soils that have a clayey or loamy subsoil; on ridgetops, side slopes, upland flats, and stream terraces

This map unit is in the northeastern part of the county. The landscape is characterized by broad ridgetops, upland flats, and short side slopes separated by moderately wide flood plains. The major soils formed in material weathered from dolomite and calcareous shale of Silurian age or in old loamy alluvium that has been deposited over the dolomite and calcareous shale. Slopes range from 0 to 30 percent.

This unit is dissected by many small drainageways and intermittent streams and by the North Fork of the Licking River, which forms the northeastern boundary of the county. Farm ponds are the embankment or

excavated type. Except for a few small communities, the major structures are scattered rural homes, farmsteads, power lines, and an adequate road system.

This unit makes up about 4 percent of the county. It is about 30 percent Beasley soils, 20 percent Shrouts soils, 14 percent Lawrence soils, and 36 percent soils of minor extent.

Beasley soils are deep or very deep, well drained, and gently sloping to steep. They are on ridgetops and side slopes. They are intermingled with areas of the Shrouts soils on moderately steep and steep side slopes. Typically, the surface layer is brown silt loam. The subsoil is yellowish brown silty clay and clay. The substratum is yellowish brown, light olive gray, strong brown, and reddish yellow clay.

Shrouts soils are moderately deep, well drained, and gently sloping to steep. They are on ridgetops and side slopes. In some areas they are intermingled with areas of the Beasley soils on moderately steep and steep side slopes. Typically, the surface layer is very dark grayish brown silty clay. The subsoil is light olive brown, olive, and greenish gray silty clay and clay. The substratum is yellowish brown, olive, and greenish gray channery clay.

Lawrence soils are very deep, somewhat poorly drained, and nearly level. They are on broad upland flats and on stream terraces. Typically, the surface layer is yellowish brown silt loam. The upper part of the subsoil is light yellowish brown and brownish yellow, mottled silt loam and silty clay loam. The next part is a very firm and brittle fragipan of light yellowish brown, yellowish brown, and pale brown silty clay loam. The lower part is pale brown, yellowish brown, and light gray silty clay loam.

Of minor extent in this unit are Nicholson and McGary soils on ridgetops and upland flats; Otwell and Elk soils on stream terraces; Newark, Melvin, and Nolin soils on flood plains; and Woolper soils on foot slopes.

Most areas of this unit are used as cropland, hayland, or pasture. The moderately steep and steep side slopes generally are used as pasture. A few of the moderately steep and steep side slopes support mixed hardwoods and eastern redcedar.

Most of the soils in this unit are suited to farming. The nearly level and gently sloping soils on ridgetops and upland flats and the minor soils on nearly level flood plains and gently sloping stream terraces are suited to most of the cultivated crops and species of hay commonly grown in the county. The Lawrence soils, which have a fragipan and a seasonal high water table, should be used for the plants that can withstand wetness. The moderately steep and steep soils are better suited to hay and permanent pasture than to

cultivated crops. The depth to bedrock, the slope, rockiness, the hazard of erosion, and wetness are management concerns.

The soils in this unit are well suited to woodland. The main concerns in managing the sloping to steep areas for timber are an equipment limitation, seedling mortality, the hazard of erosion, and plant competition. Plant competition and an equipment limitation are management concerns on the upland flats. Windthrow of some pines is a hazard on the Shrouts soils.

The gently sloping and sloping soils in this unit are suited to some urban uses. The moderately steep and steep soils, the soils on side slopes, and the nearly level, somewhat poorly drained soils on upland flats are poorly suited to most urban uses. The slope, wetness, slow permeability, the depth to bedrock, the clayey subsoil, and a moderate shrink-swell potential are limitations. Low strength is a limitation on sites for local roads and streets.

6. Muse-Blairton-Brownsville

Very deep to moderately deep, well drained or moderately well drained, gently sloping to very steep soils that have a clayey or loamy subsoil; on side slopes, ridgetops, and foot slopes

This map unit is in the eastern part of the county. The landscape is characterized by ridgetops and short, convex side slopes separated by V-shaped hollows. Some areas have isolated conical knobs. The major soils formed in residuum and colluvium derived from acid, black shale of Devonian age or from fine grained sandstone, siltstone, and shale of Mississippian age. Slopes range from 2 to 60 percent. They are dominantly 20 to 60 percent.

This unit is dissected by many small drainageways and intermittent streams. Numerous small excavated and embankment farm ponds and one large watershed structure are in areas of this unit. Scattered rural homes, farmsteads, roads, power lines, a microwave tower, and a natural gas pipeline are the major structures.

This unit makes up about 24 percent of the county. It is about 38 percent Muse soils, 14 percent Blairton soils, 11 percent Brownsville soils, and 37 percent soils of minor extent (fig. 7).

Muse soils are deep or very deep, well drained, and gently sloping to very steep. They are on side slopes and foot slopes at elevations below the Blairton and Brownsville soils. Typically, the surface layer is dark brown channery silt loam. The subsoil is strong brown silty clay in the upper part, yellowish red very channery

clay and clay in the next part, and yellowish brown silty clay in the lower part. The substratum is red, brownish yellow, and light gray channery clay.

Blairton soils are moderately deep, moderately well drained, and gently sloping to steep. They are on ridgetops and the upper side slopes at elevations above the Muse soils. Typically, the surface layer is dark yellowish brown silt loam. The subsoil is yellowish brown silt loam in the upper part; strong brown, mottled silty clay loam in the next part; and light brownish gray, mottled channery silt loam in the lower part.

Brownsville soils are deep or very deep, well drained, and steep and very steep. They are on side slopes at elevations above the Muse soils. They are intermingled with areas of the Berks soils. Typically, the surface layer is brown channery silt loam. The subsoil is brown and yellowish brown channery, very channery, and extremely channery silt loam in the upper part and yellowish brown extremely flaggy clay loam in the lower part.

Of minor extent in this unit are Berks, Trappist, Tilsit, Shrouts, Shelocta, and Colyer soils on ridgetops and side slopes and Skidmore and Newark soils on flood plains.

Most areas of this unit are used as woodland, hayland, or pasture. Some small areas of the major soils on broad ridgetops and some small areas of the minor soils on flood plains are used as cropland. The only commercial apple orchard in the county is on one of the ridgetops.

Most of the soils in this unit are poorly suited to farming. The gently sloping soils on broad ridgetops and the minor soils on flood plains are suited to most of the cultivated crops and species of hay commonly grown in the county. The moderately steep and steep soils are better suited to hay and permanent pasture than to cultivated crops. The slope, the depth to bedrock, the hazard of erosion, and rockiness are management concerns.

The soils in this unit are well suited to woodland. The main concerns in managing the sloping to very steep areas for timber are an equipment limitation, seedling mortality, the hazard of erosion, and plant competition. Plant competition also is a management concern on the gently sloping ridgetops and on the minor soils on flood plains.

The gently sloping and sloping soils on ridgetops are suited to some urban uses. The slope, the depth to bedrock, slow or very slow permeability, a moderate shrink-swell potential, and the clayey texture are limitations. The steep and very steep soils on side slopes are generally unsuited to urban uses. The slope, the depth to bedrock, rockiness, and the clayey texture

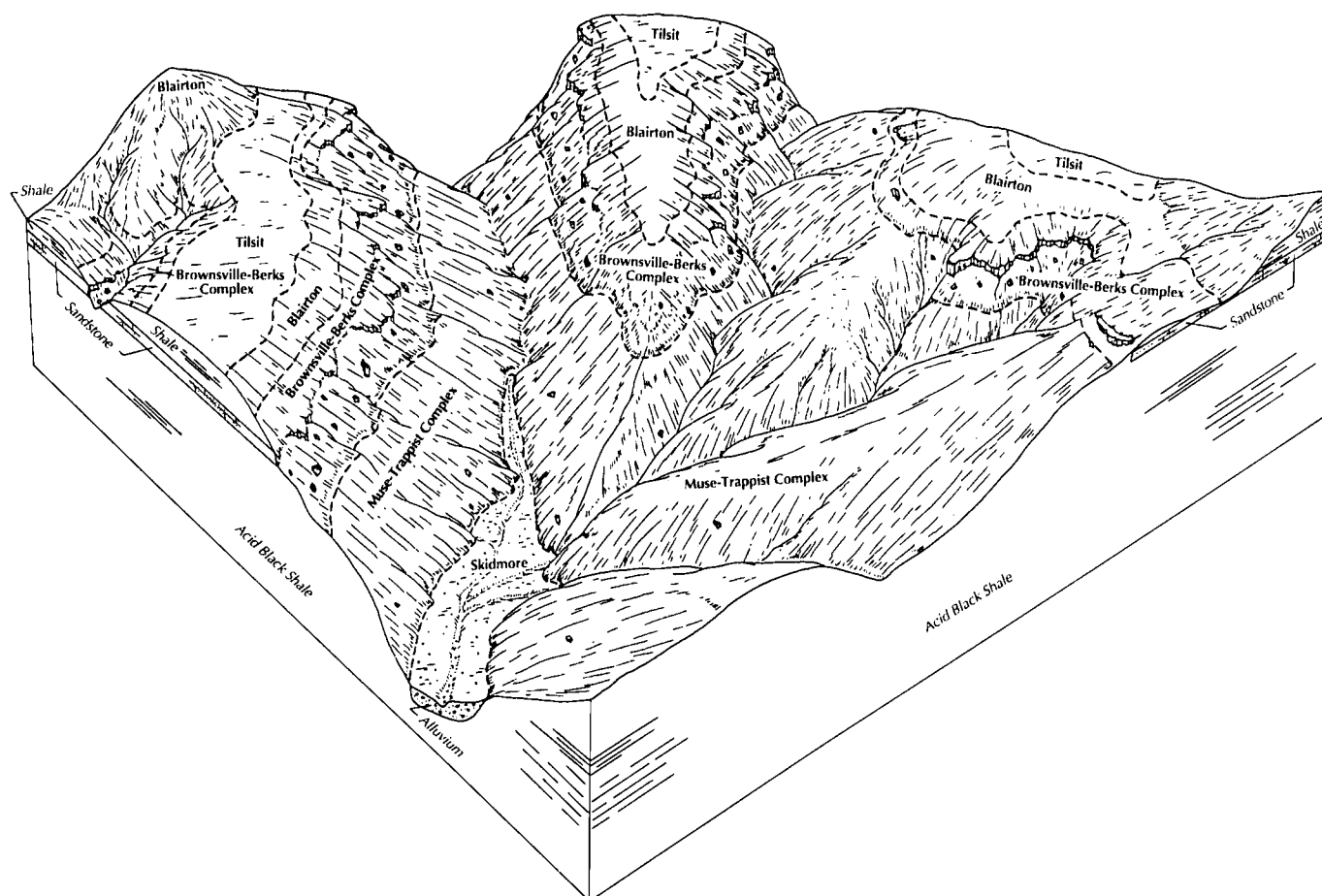


Figure 7.—Typical pattern of soils and parent material in the Muse-Blairton-Brownsville general soil map unit.

are limitations. In some areas low strength is a limitation on sites for local roads and streets.

7. Nolin-Allegheny-Newark

Very deep, well drained or somewhat poorly drained, nearly level to moderately steep soils that have a loamy subsoil; on flood plains and stream terraces

This map unit is in the southern and eastern parts of the county. The landscape is characterized by moderately long and wide stream terraces and flood plains, which are along Fox Creek and the Licking River. The major soils formed in mixed alluvium derived from sandstone, siltstone, shale, limestone, and dolomite. Slopes range from 0 to 20 percent.

Three large watershed structures and several small recreational lakes and reservoirs are in areas of this unit. A few small communities, scattered rural homes, farmsteads, roads, power lines, and a large natural gas

pipeline are the major structures.

This unit makes up about 5 percent of the county. It is about 18 percent Nolin soils, 14 percent Allegheny soils, 13 percent Newark soils, and 55 percent soils of minor extent.

Nolin soils are well drained and nearly level. They are on flood plains. Typically, the surface layer is brown silt loam. The subsoil is dark yellowish brown silt loam in the upper part and brown silt loam in the lower part. The substratum is brown very gravelly silt loam.

Allegheny soils are well drained and gently sloping to moderately steep. They are on stream terraces at elevations above the Nolin and Newark soils. Typically, the surface layer is brown fine sandy loam. The subsoil is yellowish brown silt loam in the upper part; yellowish brown and strong brown, mottled loam in the next part; and yellowish brown, mottled clay loam in the lower part. The substratum is yellowish red and yellowish brown, mottled clay loam.

Newark soils are somewhat poorly drained and nearly level. They are on flood plains. Typically, the surface layer is yellowish brown silt loam. The subsoil is mottled silt loam. It is light olive brown in the upper part and light gray in the lower part. The substratum is light brownish gray and light gray, mottled silt loam.

Of minor extent in this unit are Otwell, Morehead, Monongahela, Elk, and Lawrence soils on stream terraces and Skidmore and Melvin soils on flood plains.

Most areas of this unit are used for cultivated crops, hay, or pasture. A few areas are wooded.

Most of the soils in this unit are suited to farming. Most of the nearly level to sloping soils are well suited to the cultivated crops commonly grown in the county. Some of the somewhat poorly drained or poorly drained minor soils are better suited to hay, pasture, and woodland than to cultivated crops. Flooding, wetness, the slope, and the hazard of erosion are management concerns.

The soils in this unit are suited to woodland. The main concerns in managing the nearly level soils on flood plains for timber are an equipment limitation, seedling mortality, and plant competition. Plant competition is a management concern on the gently sloping to moderately steep stream terraces. The hazard of erosion and an equipment limitation are concerns on the moderately steep stream terraces.

The gently sloping and sloping soils on stream terraces are suited to most urban uses. The nearly level soils on flood plains are poorly suited to these uses because of flooding or wetness. Low strength in most of the soils on flood plains is a limitation on sites for local roads and streets.

8. Berks-Brownsville-Shelocta

Moderately deep to very deep, well drained, very steep and steep soils that have a loamy subsoil; on ridgetops, side slopes, benches, and upland foot slopes

This map unit is in the eastern part of the county, along the Rowan and Lewis county lines. The landscape is characterized by very narrow ridgetops; short, convex side slopes; and narrow, V-shaped hollows. The major soils formed in residuum and colluvium derived from fine grained sandstone, siltstone, and shale of Mississippian age. Slopes range from 20 to 60 percent.

This unit is dissected by many small drainageways and intermittent streams. Because of limited accessibility, power lines, logging roads, a major natural

gas pipeline, and the Jenny Wiley Trail are the only major features.

This unit makes up about 2 percent of the county. It is about 34 percent Berks soils, 23 percent Brownsville soils, 18 percent Shelocta soils, and 25 percent soils of minor extent.

Berks soils are moderately deep and are steep and very steep. They are on ridgetops and the upper side slopes, generally at elevations above the Shelocta soils. They are intermingled with areas of the Brownsville soils. Typically, the surface layer is brown very channery silt loam. The subsoil is light yellowish brown channery silt loam in the upper part and yellowish brown very channery silt loam in the lower part. The substratum is yellowish brown, mottled silty clay.

Brownsville soils are deep or very deep and are steep and very steep. They are on side slopes, generally at elevations above the Shelocta soils. They are intermingled with areas of the Berks soils. Typically, the surface layer is brown channery silt loam. The upper part of the subsoil is brown and yellowish brown channery, very channery, and extremely channery silt loam. The lower part is yellowish brown extremely flaggy clay loam.

Shelocta soils are deep or very deep and are steep and very steep. They are on side slopes, benches, and upland foot slopes, generally at elevations below the Berks and Brownsville soils. In some areas they are intermingled with areas of the Wharton soils. Typically, the surface layer is dark brown gravelly silt loam. The subsurface layer is yellowish brown gravelly silt loam. The subsoil is yellowish brown channery and very channery silt loam in the upper part and yellowish brown, mottled very channery silty clay loam in the lower part.

Of minor extent in this unit are Blairton and Wharton soils on side slopes and upland foot slopes.

Most areas of this unit support mixed hardwoods. Some small areas support Virginia pine.

This unit is generally unsuited to cultivated crops, hay, and pasture. The slope, the depth to bedrock, droughtiness, the hazard of erosion, surface stones, and the limited accessibility are management concerns.

The soils in this unit are suited to woodland. The main concerns in managing the soils for timber are an equipment limitation, seedling mortality, and the hazard of erosion.

This unit is generally unsuited to urban uses. The slope, the depth to bedrock, large surface stones, and the limited accessibility are limitations.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, and the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

In this section soils are rated as to their suitability for various uses. They are divided into four groups: well suited, suited, poorly suited, and generally not suited.

Soils that are *well suited* have favorable properties for the selected use. Limitations can be easily overcome. Good performance and low maintenance can be expected.

Soils that are *suited* have moderately favorable properties for the selected use. One or more properties make these soils less desirable than well suited soils.

Soils that are *poorly suited* have one or more properties unfavorable for the selected use. Overcoming the limitations requires special design, extra maintenance, or costly alteration.

Soils that are *generally not suited* cannot be used for the selected purpose or require extreme measures to overcome the undesirable features.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil*

phases. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Lowell silt loam, 2 to 6 percent slopes, is a phase of the Lowell series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Muse-Trappist silt loams, 20 to 55 percent slopes, eroded, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, quarries, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Some of the soil boundary lines do not join with the lines in adjacent counties because of differences in the design of the map units and changes in the concepts of some soils.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The "Glossary" defines many of the terms used in describing the soils.

AgB—Allegheny fine sandy loam, 2 to 6 percent slopes. This very deep, well drained, gently sloping soil is on stream terraces and in areas of older terrace deposits on high ridges along the Licking River in the southern part of the county. Areas are about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; brown fine sandy loam

Subsoil:

8 to 15 inches; yellowish brown silt loam

15 to 48 inches; yellowish brown and strong brown, mottled loam

48 to 53 inches; yellowish brown, mottled clay loam

Substratum:

53 to 77 inches; yellowish red and yellowish brown, mottled clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and available water capacity is high. The root zone is very deep. Surface runoff is medium. Tilth is good. The soil can be worked throughout a wide range in moisture content.

Included with this soil in mapping are small areas of Elk, Monongahela, and Nolin soils. Elk and Monongahela soils are in landscape positions similar to those of the Allegheny soil. Nolin soils are on flood plains. Also included are small areas of soils that are more sandy than the Allegheny soil; small areas of soils that are similar to the Allegheny soil but are 40 to 60 inches deep over bedrock; a few low areas of Allegheny soils that are subject to rare flooding; and, on ridgetops, small areas of soils that are similar to the Allegheny soil but have a clayey subsoil. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Allegheny soil are used for cultivated crops, hay, or pasture. A few small areas are wooded.

This soil is well suited to the cultivated crops commonly grown in the county. The hazard of erosion is moderate if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, improve fertility, and control erosion. A permanent plant cover reduces the hazard of erosion in drainageways. In some areas diversions can help to control runoff and the deposition of overwash from the adjacent upland side slopes.

This soil is well suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns

include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. American elm, black cherry, black oak, eastern redcedar, pignut hickory, red maple, sugar maple, white ash, and white oak are the most common trees. The trees preferred for planting include black walnut, eastern white pine, northern red oak, shortleaf pine, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is well suited to most urban uses. Seepage, the slope, and the content of clay are limitations on sites for some sanitary facilities. Some of the included soils in low areas and on flood plains are poorly suited to urban uses because of flooding. Good design and proper installation procedures can minimize or overcome these limitations.

The capability subclass is IIe.

AgC2—Allegheny fine sandy loam, 6 to 12 percent slopes, eroded. This very deep, well drained, sloping soil is on stream terraces and in areas of older terrace deposits on high ridges along the Licking River in the southern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Areas are about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 5 inches; brown fine sandy loam

Subsoil:

5 to 12 inches; yellowish brown silt loam

12 to 45 inches; yellowish brown and strong brown, mottled loam

45 to 50 inches; yellowish brown, mottled clay loam

Substratum:

50 to 74 inches; yellowish red and yellowish brown clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and available water capacity is high. The root zone is very deep. Surface runoff is medium. Tilth is good. The soil can be worked throughout a wide range in moisture content.

Included with this soil in mapping are small areas of Elk, Monongahela, and Nolin soils. Elk and Monongahela soils are in landscape positions similar to those of the Allegheny soil. Nolin soils are on flood

plains. Also included are small areas of soils that are more sandy than the Allegheny soil; small areas of soils that are similar to the Allegheny soil but are 40 to 60 inches deep over bedrock; and, on ridgetops, small areas of soils that are similar to the Allegheny soil but have a clayey subsoil. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Allegheny soil are used for cultivated crops, hay, or pasture. A few small areas are wooded.

This soil is suited to the cultivated crops commonly grown in the county. The slope is the main limitation. The hazard of erosion is severe if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, improve fertility, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways. In some areas diversions can help to control runoff and the deposition of overwash from the adjacent upland side slopes.

This soil is well suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. American elm, black cherry, black oak, eastern redcedar, pignut hickory, red maple, sugar maple, white ash, white oak, and yellow-poplar are the most common trees. The trees preferred for planting include black walnut, eastern white pine, northern red oak, shortleaf pine, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to most urban uses. The slope is a limitation affecting most kinds of building site development. The content of clay, the slope, and seepage are limitations on sites for some sanitary facilities. Good design and proper installation procedures can minimize or overcome these limitations.

The capability subclass is IIIe.

AgD—Allegheny fine sandy loam, 12 to 20 percent slopes. This very deep, well drained, moderately steep soil is on stream terraces and in areas of older terrace

deposits on high ridges along the Licking River in the southern part of the county. Areas are about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; brown fine sandy loam

Subsoil:

8 to 15 inches; yellowish brown silt loam

15 to 48 inches; yellowish brown and strong brown, mottled loam

48 to 53 inches; yellowish brown, mottled clay loam

Substratum:

53 to 77 inches; yellowish red and yellowish brown clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and available water capacity is high. The root zone is very deep. Surface runoff is rapid. Tilth is good. The soil can be worked throughout a wide range in moisture content.

Included with this soil in mapping are small areas of Elk, Monongahela, and Nolin soils. Elk and Monongahela soils are in landscape positions similar to those of the Allegheny soil. Nolin soils are on flood plains. Also included are small areas of soils that are more sandy than the Allegheny soil; small areas of soils that are similar to the Allegheny soil but are 40 to 60 inches deep over bedrock; on ridgetops, small areas of soils that are similar to the Allegheny soil but have a clayey subsoil; areas of the Allegheny soils that have a gravelly surface; and some small areas of soils that are eroded. Included soils make up about 10 to 15 percent of this map unit.

Most areas of the Allegheny soil are used for hay and pasture. A few small areas are wooded.

This soil is suited to occasional cultivation, but it is better suited to pasture and hay. The slope is the main limitation. The hazard of erosion is very severe if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates

and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is suited to woodland. American elm, black cherry, black oak, eastern redcedar, pignut hickory, red maple, sugar maple, white ash, white oak, and yellow-poplar are the most common trees. The trees preferred for planting include black walnut, eastern white pine, northern red oak, shortleaf pine, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concerns are plant competition, the hazard of erosion, and an equipment limitation. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The slope is the main limitation. Good design and proper installation procedures can minimize or overcome this limitation.

The capability subclass is IVe.

BaB—Beasley silt loam, 2 to 6 percent slopes. This deep and very deep, well drained, gently sloping soil is on the broad, convex tops of ridges in the central part of the county. Areas are about 5 to 170 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 10 inches; brown silt loam

Subsoil:

10 to 17 inches; yellowish brown silty clay

17 to 32 inches; yellowish brown clay

Substratum:

32 to 60 inches; yellowish brown, light olive gray, strong brown, and reddish yellow clay

Bedrock:

60 to 72 inches; soft, calcareous shale interbedded with dolomite and siltstone

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow, and available water capacity is high. The root zone is deep or very deep. Surface runoff is medium. Tilth is good. The shrink-swell potential is moderate. The depth to calcareous shale, dolomite, siltstone, or limestone is more than 40 inches.

Included with this soil in mapping are small areas of Crider, Faywood, Lowell, and Nicholson soils. These soils are in landscape positions similar to those of the Beasley soil. Also included are small areas of soils that are similar to the Beasley soil but are moderately well drained and areas of soils that are moderately deep over bedrock. Included soils make up about 10 to 15 percent of this map unit.

Most areas of the Beasley soil are used for cultivated crops, hay, or pasture. Some areas are used for residential or urban development. A few areas are wooded.

This soil is well suited to the cultivated crops commonly grown in the county. The hazard of erosion is moderate if conventional tillage is used. Farming on the contour, strip cropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and control erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is well suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black locust, chinkapin oak, eastern redcedar, hickory, scarlet oak, white ash, and white oak are the most common trees. The trees preferred for planting include white ash, white oak, and Virginia pine. Table 7 provides specific information relating to potential productivity. The main management concerns are plant competition, the hazard of erosion, and an equipment limitation. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The content of clay, the depth to bedrock, and the moderately slow permeability are limitations on sites for most sanitary facilities. The moderate shrink-swell potential and the content of clay are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIe.

BeC2—Beasley silty clay loam, 6 to 12 percent slopes, eroded. This deep and very deep, well drained, sloping soil is on long, narrow, convex ridgetops and the upper side slopes in the central part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Areas are about 5 to 170 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 5 inches; brown silty clay loam

Subsoil:

5 to 12 inches; yellowish brown silty clay
12 to 27 inches; yellowish brown clay

Substratum:

27 to 55 inches; yellowish brown, light olive gray,
strong brown, and reddish yellow clay

Bedrock:

55 to 67 inches; soft, calcareous shale interbedded
with dolomite and siltstone

This soil is medium in natural fertility and low in organic matter content. Permeability is moderately slow, and available water capacity is high. The root zone is deep or very deep. Surface runoff is medium. Tilth is only fair because the surface layer is mixed with the clayey subsoil. The shrink-swell potential is moderate. The depth to calcareous shale, dolomite, siltstone, or limestone is more than 40 inches.

Included with this soil in mapping are small areas of Crider and Shrouts soils and a few areas of Beasley soils that are uneroded or severely eroded. Crider and Shrouts soils are in landscape positions similar to those of the Beasley soil. Also included are some areas of soils that are similar to the Beasley soil but are moderately deep over bedrock and small areas of coarse grained dolomite rock outcrops. Included areas make up about 5 to 25 percent of this map unit.

Most areas of the Beasley soil are used for hay and pasture. A few areas are wooded.

This soil is suited to cultivated crops. The slope is the main limitation. The hazard of erosion is severe if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, improve fertility, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is well suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black locust, chinkapin oak, eastern redcedar, hickory, scarlet oak, white ash, and white oak are the most common trees. The trees preferred for planting include white ash, white

oak, and Virginia pine. Table 7 provides specific information relating to potential productivity. The main management concerns are plant competition, the hazard of erosion, and an equipment limitation. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The slope, the content of clay, the depth to bedrock, and the moderately slow permeability are limitations on sites for most sanitary facilities. The moderate shrink-swell potential, the content of clay, and the slope are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIIe.

BhE3—Beasley-Shrouts complex, rocky, 12 to 30 percent slopes, severely eroded. These very deep to moderately deep, well drained soils are on moderately steep and steep side slopes in the central and eastern parts of the county. Erosion has removed most of the original surface layer and, in places, some of the subsoil. Some areas have rills and shallow gullies. Dolomite rock outcrop and soils that are less than 10 inches deep over bedrock make up about 1 to 3 percent of this unit. Brown, coarse grained dolomite chert channers and gravel cover about 0.1 to 10 percent of the surface. Areas are about 5 to more than 500 acres in size. The two soils occur as areas so closely intermingled that they could not be mapped separately at the scale selected for mapping.

The Beasley soil makes up about 50 percent of this unit, and the Shrouts soil makes up about 40 percent. Included soils make up the rest.

The typical sequence, depth, and composition of the layers of the Beasley soil are as follows—

Surface layer:

0 to 4 inches; brown silty clay loam

Subsoil:

4 to 11 inches; yellowish brown silty clay
11 to 26 inches; yellowish brown clay

Substratum:

26 to 54 inches; yellowish brown, light olive gray,
strong brown, and reddish yellow clay

Bedrock:

54 to 66 inches; soft, calcareous shale interbedded
with dolomite and siltstone

The Beasley soil is medium in natural fertility and low in organic matter content. Permeability is moderately slow, and available water capacity is high. The root

zone is deep or very deep. Surface runoff is rapid. The shrink-swell potential is moderate. The depth to calcareous shale, dolomite, siltstone, or limestone is more than 40 inches.

The typical sequence, depth, and composition of the layers of the Shrouts soil are as follows—

Surface layer:

0 to 4 inches; very dark grayish brown silty clay

Subsoil:

4 to 27 inches; light olive brown, olive, and greenish gray silty clay and clay

Substratum:

27 to 35 inches; yellowish brown, olive, and greenish gray channery clay

Bedrock:

35 to 40 inches; soft, layered, calcareous shale

The Shrouts soil is low in natural fertility and moderate or high in organic matter content. Permeability is slow, and available water content is moderate. The root zone is moderately deep. Surface runoff is rapid. The shrink-swell potential is moderate. The depth to soft, calcareous shale bedrock ranges from 20 to 40 inches.

Included with these soils in mapping are small areas of a soil that is similar to the Shrouts soil but is redder in the subsoil and is deeper to weathered bedrock. This included soil is in landscape positions similar to those of the Beasley and Shrouts soils. Also included are areas of Beasley and Shrouts soils that are moderately eroded, small areas of soils that have a loamy subsoil, small areas of soils that are less than 20 inches deep over bedrock, and some areas of soils that have slopes of 30 to 40 percent. Included soils make up about 10 percent of this map unit.

In most areas the Beasley and Shroats soils are used as pasture or unimproved woodland. They are generally unsuited to cultivated crops because of the slope, the depth to bedrock, the rock outcrop, numerous rock fragments, droughtiness, and a very severe hazard of erosion.

Because mowing and renovation are difficult, these soils are poorly suited to hay. They are best suited to permanent pasture or woodland. The grasses selected for planting should be those that are dense rooted, can withstand droughtiness, and require the least amount of renovation. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, and control of undesirable vegetation. The slope and the rock outcrop limit the use of farm machinery.

These soils are suited to woodland. Eastern

redcedar, scarlet oak, and white oak are the most common trees. The trees preferred for planting include white ash, white oak, and Virginia pine. Table 7 provides specific information relating to potential productivity. The main management concerns are plant competition, the hazard of erosion, an equipment limitation, and seedling mortality. Windthrow of some species of pine is a hazard on the Shrouts soil. Reforestation can be severely limited because of competition from undesirable understory plants.

These soils are poorly suited to urban uses. The slope, the content of clay, the depth to bedrock, the rock outcrop, the moderate shrink-swell potential, and the moderately slow permeability are limitations. Overcoming these limitations is difficult and expensive.

The capability subclass is VIIe.

BkF2—Berks-Brownsville complex, 30 to 60 percent slopes, eroded. These moderately deep to very deep, well drained, very steep soils are on the highest ridgetops and side slopes in the eastern part of the county. Sandstone stones and boulders cover less than 1 percent of the surface. Erosion has removed about 25 to 75 percent of the original surface layer. Areas are about 5 to 200 acres in size. The two soils occur as areas so closely intermingled that they could not be mapped separately at the scale selected for mapping.

The Berks soil makes up about 60 percent of this unit, and the Brownsville soil makes up about 35 percent. Included soils make up the rest.

The typical sequence, depth, and composition of the layers of the Berks soil are as follows—

Surface layer:

0 to 4 inches; brown very channery silt loam

Subsoil:

4 to 13 inches; light yellowish brown channery silt loam

13 to 27 inches; yellowish brown very channery silt loam

Substratum:

27 to 33 inches; yellowish brown, mottled silty clay

Bedrock:

33 inches; hard, fine grained sandstone

The Berks soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate or moderately rapid, and available water capacity is low. The root zone is moderately deep. Surface runoff is very rapid. The depth to bedrock ranges from 20 to 40 inches.

The typical sequence, depth, and composition of the layers of the Brownsville soil are as follows—

Surface layer:

0 to 4 inches; brown channery silt loam

Subsoil:

4 to 41 inches; brown and yellowish brown channery, very channery, and extremely channery silt loam

41 to 54 inches; yellowish brown extremely flaggy clay loam

Bedrock:

54 inches; hard, fine grained sandstone

The Brownsville soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate or moderately rapid, and available water capacity is moderate. The root zone is deep or very deep. Surface runoff is very rapid. The depth to bedrock ranges from 40 to 72 inches.

Included with these soils in mapping are small areas of Shelocta and Wharton soils. These included soils are in landscape positions similar to those of the Berks and Brownsville soils. Also included are a few areas of loamy soils that are less than 20 inches deep over bedrock, some areas of soils that are similar to the Berks and Brownsville soils but have about 5 to 15 percent rock fragments in the subsoil, and areas of rock outcrop and rubble land. Included areas make up about 5 to 10 percent of this map unit.

The Berks and Brownsville soils are used as woodland. They are generally unsuited to cultivated crops, hay, and pasture because of the slope, the depth to bedrock, a high content of rock fragments, droughtiness, and a very severe hazard of erosion.

These soils are suited to woodland. Black oak, chestnut oak, scarlet oak, and white oak are the most common trees. The understory is mostly chestnut oak, flowering dogwood, hickory, ironwood, mountain laurel, sassafras, serviceberry, and sourwood. The trees preferred for planting include eastern white pine, shortleaf pine, and white oak. Table 7 provides specific information relating to potential productivity and the trees suitable for planting on warm and cool aspects.

The main concerns in managing woodland are the hazard of erosion, an equipment limitation, seedling mortality, and plant competition. Steep skid trails and logging roads are subject to rilling and gullying unless they are protected by adequate water bars or a plant cover, or both. The slope restricts the use of wheeled equipment on skid trails. Careful management of reforestation after harvesting helps to control competition from undesirable understory plants.

These soils are generally unsuited to urban uses. The slope, the depth to bedrock, and a high content of

rock fragments are limitations. Accessibility is limited in most areas.

The capability subclass is Vlle.

BrB—Blairton silt loam, 2 to 6 percent slopes. This moderately deep, moderately well drained, gently sloping soil is on the broad, convex tops of ridges in the Knobs area in the eastern part of the county. Areas are about 5 to 10 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; dark yellowish brown silt loam

Subsoil:

8 to 16 inches; yellowish brown silt loam

16 to 20 inches; strong brown, mottled silty clay loam

20 to 29 inches; light brownish gray, mottled channery silt loam

Bedrock:

29 to 37 inches; soft, layered shale

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow, and available water capacity is moderate. The root zone is moderately deep. Surface runoff is medium. The seasonal high water table is at a depth of 24 to 42 inches. Tilth is good. The depth to weathered bedrock of interbedded shale and siltstone or fine grained sandstone ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Tilsit and Wharton soils. These soils are in landscape positions similar to those of the Blairton soil. Also included are some small areas of soils that are similar to the Blairton soil but are deeper over weathered bedrock, have more clay in the subsoil, or are somewhat poorly drained. Included soils make up about 5 to 15 percent of this map unit.

Most areas of the Blairton soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is suited to the cultivated crops commonly grown in the county. Tobacco and corn are the major crops. They generally are grown in fields 10 acres or less in size. The hazard of erosion is moderate if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and control erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is suited to hay and pasture. The plants that have moderately deep rooting systems and are tolerant

of seasonal wetness grow best. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is suited to woodland. Black oak, chestnut oak, hickory, scarlet oak, shortleaf pine, Virginia pine, and white oak are the most common trees. The trees preferred for planting include eastern white pine, northern red oak, shortleaf pine, and white oak. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The depth to bedrock, the wetness, and the moderately slow permeability are limitations on sites for most sanitary facilities. The wetness is a limitation affecting most kinds of building site development. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIe.

BrC2—Blairton silt loam, 6 to 12 percent slopes, eroded. This moderately deep, moderately well drained, sloping soil is on convex ridgetops and the upper side slopes in the Knobs area in the eastern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Areas are about 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches; dark yellowish brown silt loam

Subsoil:

6 to 14 inches; yellowish brown silt loam

14 to 18 inches; strong brown, mottled silty clay loam

18 to 27 inches; light brownish gray, mottled channery silt loam

Bedrock:

27 to 35 inches; soft, layered shale

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow, and available water capacity is moderate. The root zone is moderately deep. Surface runoff is medium. The seasonal high water table is at a depth of 24 to 42 inches. Tilth is good. The depth to weathered bedrock

of interbedded shale and siltstone or fine grained sandstone ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Berks, Tilsit, and Wharton soils. These soils are in landscape positions similar to those of the Blairton soil. Also included are some small areas of soils that are similar to the Blairton soil but are deeper to weathered bedrock, contain more clay in the subsoil, or are somewhat poorly drained. Included soils make up about 5 to 25 percent of this map unit.

Most areas of the Blairton soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is suited to the cultivated crops commonly grown in the county. Tobacco and corn are the major crops. They generally are grown in fields 10 acres or less in size. The slope is the main limitation. The hazard of erosion is severe if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is suited to hay and pasture. The plants that have moderately deep rooting systems and are tolerant of seasonal wetness grow best. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is suited to woodland. Black oak, chestnut oak, hickory, scarlet oak, shortleaf pine, Virginia pine, and white oak are the most common trees. The trees preferred for planting include eastern white pine, northern red oak, shortleaf pine, and white oak. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The slope, the depth to bedrock, the wetness, and the moderately slow permeability are limitations on sites for most sanitary facilities. The wetness and the slope are limitations affecting most kinds of building site development. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIle.

BrE2—Blairton silt loam, 12 to 30 percent slopes, eroded. This moderately deep, moderately well drained, moderately steep and steep soil is on narrow ridgetops and the upper side slopes in the Knobs area in the eastern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Areas are about 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches; dark yellowish brown silt loam

Subsoil:

6 to 14 inches; yellowish brown silt loam

14 to 18 inches; strong brown, mottled silty clay loam

18 to 27 inches; light brownish gray, mottled channery silt loam

Bedrock:

27 to 35 inches; soft, layered shale

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow, and available water capacity is moderate. The root zone is moderately deep. Surface runoff is rapid. The seasonal high water table is at a depth of 24 to 42 inches. The depth to weathered bedrock of interbedded shale and siltstone or fine grained sandstone ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Berks, Tilsit, and Wharton soils. These soils are in landscape positions similar to those of the Blairton soil. Also included are some small areas of soils that are similar to the Blairton soil but are deeper to weathered bedrock, contain more clay in the subsoil, or are well drained. Included soils make up about 5 to 20 percent of this map unit.

Most areas of the Blairton soil are used for hay, pasture, or woodland. This soil is poorly suited to cultivated crops. The slope is the main limitation.

This soil is suited to hay and pasture. Areas that have slopes of more than 20 percent are better suited to permanent pasture than to hay because of an equipment limitation. The plants that have moderately deep rooting systems and are tolerant of seasonal wetness grow best. The species selected for planting should be those that provide high-quality forage and an adequate ground cover and require the least amount of renovation. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, and control of undesirable vegetation.

This soil is suited to woodland. Black oak, chestnut

oak, hickory, scarlet oak, shortleaf pine, Virginia pine, and white oak are the most common trees. The trees preferred for planting include eastern white pine, northern red oak, shortleaf pine, and white oak. Table 7 provides specific information relating to potential productivity. The main concerns in managing woodland are the hazard of erosion, an equipment limitation, and plant competition. Reforestation can be severely limited because of competition from undesirable understory plants. The slope can restrict the use of some wheeled equipment.

This soil is poorly suited to most urban uses. The slope, the depth to bedrock, the wetness, and the moderately slow permeability are limitations on sites for most sanitary facilities. The slope and the wetness are limitations affecting most kinds of building site development. Overcoming these limitations is difficult and expensive.

The capability subclass is Vle.

Bs—Boonesboro silt loam, frequently flooded. This moderately deep, well drained, nearly level soil is on flood plains in narrow and moderately wide valleys in the western and central parts of the county. Slopes are uniform and range from 0 to 3 percent. Areas are about 5 to 125 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 10 inches; dark brown silt loam

Subsurface layer:

10 to 20 inches; brown silt loam

Subsoil:

20 to 26 inches; brown gravelly silt loam

26 to 33 inches; brown very gravelly silt loam

Bedrock:

33 inches; hard limestone

This soil is high in natural fertility and in organic matter content. Permeability is moderate in the surface layer and rapid in the subsoil. Available water capacity is moderate. The root zone is moderately deep. Surface runoff is medium. Tillth is good. The soil can be worked throughout a wide range in moisture content. It is frequently flooded during winter and early spring. The depth to hard limestone ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Newark, Nolin, and Woolper soils. These soils are in landscape positions similar to those of the Boonesboro soil. Also included are small areas of soils that are similar to the Boonesboro soil but do not have a dark surface layer. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Boonesboro soil are used as pasture or woodland. A few small areas are used for cultivated crops.

This soil is suited to some of the cultivated crops commonly grown in the county. Corn is the major crop. The main management concern is flooding in winter and early spring. Farming on the contour, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth and maintain the organic matter content. A permanent plant cover reduces the hazard of erosion on streambanks. Diversions can help to control runoff and the deposition of overwash from the adjacent upland side slopes.

This soil is suited to hay and pasture. Some plants may be damaged by flooding in winter and early spring. The species selected for planting should be those that provide high-quality forage and an adequate ground cover and are tolerant of flooding. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. American elm, American sycamore, hackberry, sweetgum, white ash, and yellow-poplar are the most common trees. The trees preferred for planting include eastern cottonwood, sweetgum, white ash, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concerns are seedling mortality and plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is generally not suited to urban uses. The hazard of flooding and the depth to bedrock are the main management concerns affecting sanitary facilities and most kinds of building site development.

The capability subclass is IIw.

BwF2—Brownsville-Berks complex, very rocky, 20 to 55 percent slopes, eroded. These very deep to moderately deep, well drained, steep and very steep soils are on side slopes in the eastern part of the county. Rock outcrop and soils that are less than 5 inches deep over bedrock make up about 4 percent of this unit. Sandstone channers, flagstones, and boulders cover about 6 percent of the surface. Erosion has removed about 25 to 75 percent of the original surface layer. Areas are irregular in shape and are about 20 to more than 200 acres in size. The two soils occur as areas so closely intermingled that they could not be mapped separately at the scale selected for mapping.

The Brownsville soil makes up about 50 percent of this unit, and the Berks soil makes up about 40 percent. Included soils make up the rest.

The typical sequence, depth, and composition of the layers of the Brownsville soil are as follows—

Surface layer:

0 to 4 inches; brown channery silt loam

Subsoil:

4 to 41 inches; brown and yellowish brown channery, very channery, and extremely channery silt loam

41 to 54 inches; yellowish brown extremely flaggy clay loam

Bedrock:

54 inches; hard, fine grained sandstone

The Brownsville soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate or moderately rapid, and available water capacity is moderate. The root zone is deep or very deep. Surface runoff is very rapid. The depth to bedrock ranges from 40 to 72 inches.

The typical sequence, depth, and composition of the layers of the Berks soil are as follows—

Surface layer:

0 to 4 inches; brown very channery silt loam

Subsoil:

4 to 13 inches; light yellowish brown channery silt loam

13 to 27 inches; yellowish brown very channery silt loam

Substratum:

27 to 33 inches; yellowish brown, mottled silty clay

Bedrock:

33 inches; hard, fine grained sandstone

The Berks soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate or moderately rapid, and available water capacity is low. The root zone is moderately deep. Surface runoff is rapid. The depth to bedrock ranges from 20 to 40 inches.

Included with these soils in mapping are small areas of Blairton, Shelocta, and Wharton soils. These included soils are in landscape positions similar to those of the Brownsville and Berks soils. Also included are a few areas of loamy soils that are less than 20 inches deep over bedrock and some areas of soils that are similar to the Berks and Brownsville soils but have about 5 to 15 percent rock fragments in the subsoil. Included soils make up about 10 percent of this map unit.

The Brownsville and Berks soils are used mainly as



Figure 8.—A wooded area of Brownsville-Berks complex, very rocky, 20 to 55 percent slopes, eroded.

woodland (fig. 8). A few small areas are used as pasture. These soils are generally unsuited to cultivated crops, hay, and pasture because of the slope, the depth to bedrock, a high content of rock fragments, the rock outcrop, the common stones and boulders on the surface, droughtiness, and a very severe hazard of erosion.

These soils are suited to woodland. Black oak, chestnut oak, scarlet oak, and white oak are the most common trees. The understory is mainly eastern redbud, flowering dogwood, hickory, ironwood, red maple, sassafras, and sourwood. The trees preferred for planting include eastern white pine, shortleaf pine,

and white oak. Table 7 provides specific information relating to potential productivity and the trees suitable for planting on warm and cool aspects.

The main concerns in managing woodland are the hazard of erosion, an equipment limitation, seedling mortality, and plant competition. Steep skid trails and logging roads are subject to rilling and gullying unless they are protected by adequate water bars or a plant cover, or both. The slope restricts the use of wheeled equipment on skid trails. Careful management of reforestation after the trees are harvested helps to control competition from undesirable understory plants.

These soils generally are not suited to urban uses.

The slope, the depth to bedrock, the rock outcrop, the common stones and boulders on the surface, and the high content of rock fragments are limitations. Accessibility is limited in most areas.

The capability subclass is VIIe.

CoF2—Colyer-Trappist complex, 12 to 55 percent slopes, eroded. These shallow or moderately deep, well drained, moderately steep to very steep soils are on side slopes in the eastern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Areas are about 5 to 25 acres in size. The two soils occur as areas so closely intermingled that they could not be mapped separately at the scale selected for mapping.

The Colyer soil makes up about 40 percent of this unit, and the Trappist soil makes up about 40 percent. Included soils make up the rest.

The typical sequence, depth, and composition of the layers of the Colyer soil are as follows—

Surface layer:

0 to 2 inches; dark yellowish brown channery silty clay loam

Subsoil:

2 to 5 inches; yellowish brown very channery silty clay

5 to 10 inches; yellowish brown very channery clay

Substratum:

10 to 17 inches; yellowish brown, mottled extremely channery clay

Bedrock:

17 inches; hard, black shale

The Colyer soil is low in natural fertility and in organic matter content. Permeability is slow, and available water content is low. The root zone is shallow. Surface runoff is very rapid. The depth to bedrock ranges from 8 to 20 inches.

The typical sequence, depth, and composition of the layers of the Trappist soil are as follows—

Surface layer:

0 to 2 inches; dark yellowish brown silt loam

Subsurface layer:

2 to 6 inches; brown silty clay loam

Subsoil:

6 to 23 inches; yellowish red silty clay and clay

23 to 35 inches; yellowish red, mottled channery clay

Bedrock:

35 inches; hard, black shale

The Trappist soil is medium in natural fertility and moderate in organic matter content. Permeability is slow, and available water capacity is moderate. The root zone is moderately deep. Surface runoff is rapid. The shrink-swell potential is moderate. The depth to bedrock ranges from 20 to 40 inches.

Included with these soils in mapping are small areas of Berks, Blairton, Brownsville, and Muse soils. These included soils are in landscape positions similar to those of the Colyer and Trappist soils. Also included are a few small areas of Colyer and Trappist soils that are severely eroded, some areas of black shale outcrop, and a few areas where slopes are 55 to 90 percent. Included areas make up about 20 percent of this map unit.

The Colyer and Trappist soils are used as woodland. They are generally unsuited to cultivated crops, hay, and pasture because of the slope, the depth to bedrock, extreme acidity, droughtiness, and a very severe hazard of erosion.

These soils are poorly suited to woodland. Black oak, chestnut oak, scarlet oak, Virginia pine, and white oak are the most common trees. The trees preferred for planting include shortleaf pine, Virginia pine, and white oak. Table 7 provides specific information relating to potential productivity and the trees suitable for planting on warm and cool aspects.

The main concerns in managing woodland are the hazard of erosion, an equipment limitation, seedling mortality, and plant competition. Steep skid trails and logging roads are subject to rilling and gulying unless they are protected by adequate water bars or a plant cover, or both. The slope restricts the use of wheeled equipment on skid trails. Reforestation after the trees are harvested should coincide with periods of rainfall because of the seedling mortality rate caused by droughtiness.

These soils generally are not suited to urban uses. The slope, the depth to bedrock, the slow permeability, the content of clay, and low strength are limitations. Overcoming these limitations is difficult and expensive. Most areas are inaccessible.

The capability subclass is VIIe.

CrB—Crider silt loam, 2 to 6 percent slopes. This very deep, well drained, gently sloping soil is on the broad, convex tops of ridges in the central and northern parts of the county. Areas are about 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; dark yellowish brown silt loam

Subsoil:

8 to 30 inches; strong brown and yellowish red silty clay loam

30 to 86 inches; yellowish red and red silty clay

86 to 96 inches; red clay

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate, and available water capacity is high. The root zone is very deep. Surface runoff is medium. Tilth is good. The soil can be worked throughout a wide range in moisture content. The shrink-swell potential is moderate in the lower part of the subsoil.

Included with this soil in mapping are small areas of Beasley and Nicholson soils. These soils are in landscape positions similar to those of the Crider soil. Also included are some small areas of soils that are similar to the Crider soil but have a browner subsoil and some small areas of a soil that is moderately deep over bedrock. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Crider soil are used for cultivated crops, hay, or pasture. Some areas are used for residential or urban development. A few areas are wooded.

This soil is well suited to the cultivated crops commonly grown in the county. The hazard of erosion is moderate if conventional tillage is used. Farming on the contour, strip cropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and control erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is well suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black oak, black walnut, hickory, northern red oak, sugar maple, white ash, and white oak are the most common trees. The trees preferred for planting include black walnut, eastern white pine, northern red oak, shortleaf pine, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is well suited to most urban uses. The content of clay and the slope are the main limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is 11e.

CrC—Crider silt loam, 6 to 12 percent slopes. This very deep, well drained, gently sloping soil is on ridgetops and side slopes in the central and northern parts of the county. Areas are about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; dark yellowish brown silt loam

Subsoil:

8 to 30 inches; strong brown and yellowish red silty clay loam

30 to 86 inches; yellowish red and red silty clay

86 to 96 inches; red clay

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate, and available water capacity is high. The root zone is very deep. Surface runoff is medium. Tilth is good. The soil can be worked throughout a wide range in moisture content. The shrink-swell potential is moderate in the lower part of the subsoil.

Included with this soil in mapping are small areas of Beasley and Shrouts soils. These soils are in landscape positions similar to those of the Crider soil. Also included are some small areas of a soil that is similar to the Crider soil but has a browner subsoil and some small areas of a soil that is moderately deep over bedrock. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Crider soil are used for pasture, hay, or cultivated crops. A few areas are wooded.

This soil is suited to the cultivated crops commonly grown in the county. The slope is the main limitation. The hazard of erosion is severe if conventional tillage is used. Farming on the contour, strip cropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is well suited to hay and pasture. The species selected for planting should be those that

provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black oak, black walnut, hickory, northern red oak, sugar maple, white ash, and white oak are the most common trees. The trees preferred for planting include black walnut, eastern white pine, northern red oak, shortleaf pine, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to most urban uses. The content of clay and the slope are limitations affecting most sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIIe.

CyC2—Cynthiana-Faywood complex, 6 to 12 percent slopes, eroded. These shallow or moderately deep, well drained or somewhat excessively drained soils are on the sloping, convex tops of ridges in the central part of the county. Most areas have small sinkholes or depressions through which water drains. Erosion has removed about 25 to 75 percent of the original surface layer. Areas are about 10 to more than 100 acres in size. The two soils occur as areas so closely intermingled that they could not be mapped separately at the scale selected for mapping.

The Cynthiana soil makes up about 65 percent of this unit, and the Faywood soil makes up about 25 percent. Included soils make up the rest.

The typical sequence, depth, and composition of the layers of the Cynthiana soil are as follows—

Surface layer:

0 to 2 inches; brown silty clay loam

Subsoil:

2 to 8 inches; light olive brown flaggy clay

8 to 18 inches; light olive brown and yellowish brown flaggy silty clay

Bedrock:

18 inches; hard limestone

The Cynthiana soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow, and available water capacity is low.

The root zone is shallow. Surface runoff is rapid. Tilth is poor because the surface layer is mixed with the clayey subsoil. The shrink-swell potential is moderate. The depth to bedrock ranges from 10 to 20 inches.

The typical sequence, depth, and composition of the layers of the Faywood soil are as follows—

Surface layer:

0 to 5 inches; brown silt loam

Subsoil:

5 to 11 inches; dark yellowish brown silty clay

11 to 34 inches; yellowish brown clay

Bedrock:

34 inches; hard limestone

The Faywood soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow or slow, and available water capacity is moderate. The root zone is moderately deep. Surface runoff is medium. Tilth is only fair because the surface layer is mixed with the clayey subsoil. The shrink-swell potential is moderate in the subsoil. The depth to bedrock ranges from 20 to 40 inches.

Included with these soils in mapping are small areas of Beasley and Lowell soils and small areas of soils around the perimeter of sinkholes that are less than 10 inches deep over bedrock and have a flaggy surface layer. Beasley and Lowell soils are in landscape positions similar to those of the Cynthiana and Faywood soils. Also included are small areas of soils that are similar to the Faywood soil but are redder in the upper part of the subsoil. Included soils make up about 10 percent of this map unit.

Most areas of the Cynthiana and Faywood soils are used as pasture. Some small areas are used for hay, cultivated crops, or woodland.

These soils are poorly suited to cultivated crops because of the numerous sinkholes, the content of rock fragments, the depth to bedrock, droughtiness, and a severe hazard of erosion. If cultivated crops are grown, farming on the contour, applying a system of conservation tillage, returning crop residue to the soils, growing cover crops, and including grasses and legumes in the cropping sequence help to maintain the content of organic matter and control erosion.

These soils are suited to hay but are better suited to permanent pasture or woodland. The species selected for planting should be those that provide adequate forage and can withstand the droughtiness caused by the limited rooting depth. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, and control of undesirable vegetation.

These soils are suited to woodland. Chinkapin oak, eastern redcedar, white ash, and white oak are the most common trees. The trees preferred for planting include white ash and white oak. Table 7 provides specific information relating to potential productivity. The main management concerns are plant competition, an equipment limitation, and seedling mortality. Reforestation can be severely limited because of competition from undesirable understory plants.

These soils are poorly suited to most urban uses. The slope, the content of clay, the depth to bedrock, and the moderately slow or slow permeability are limitations on sites for most sanitary facilities. The slope and the depth to bedrock are limitations affecting most kinds of building site development. Low strength, the depth to bedrock, and the slope are limitations on sites for local roads and streets. Good design and proper installation procedures can overcome or minimize some of these limitations.

The capability subclass is IVE.

CyE2—Cynthiana-Faywood complex, very rocky, 12 to 35 percent slopes, eroded. These shallow or moderately deep, well drained or somewhat excessively drained soils are on moderately steep to very steep side slopes in the central part of the county. Rock outcrop and soils that are less than 5 inches deep over bedrock make up 2 to 5 percent of this unit. Limestone flagstones, mostly less than 15 inches in diameter, cover about 9 percent of the surface. Erosion has removed about 25 to 75 percent of the surface layer. Areas are about 5 to more than 150 acres in size. The two soils occur as areas so closely intermingled that they could not be mapped separately at the scale selected for mapping.

The Cynthiana soil makes up about 60 percent of this unit, and the Faywood soil makes up about 30 percent. Included soils and rock outcrop make up the rest.

The typical sequence, depth, and composition of the layers of the Cynthiana soil are as follows—

Surface layer:

0 to 2 inches; brown silty clay loam

Subsoil:

2 to 8 inches; light olive brown flaggy clay

8 to 18 inches; light olive brown and yellowish brown flaggy silty clay

Bedrock:

18 inches; hard limestone

The Cynthiana soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow, and available water capacity is low. The root zone is shallow. Surface runoff is rapid. The

shrink-swell potential is moderate. The depth to bedrock ranges from 10 to 20 inches.

The typical sequence, depth, and composition of the layers of the Faywood soil are as follows—

Surface layer:

0 to 5 inches; brown silt loam

Subsoil:

5 to 11 inches; dark yellowish brown silty clay

11 to 34 inches; yellowish brown clay

Bedrock:

34 inches; hard limestone

The Faywood soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow or slow, and available water capacity is moderate. The root zone is moderately deep. Surface runoff is medium. The shrink-swell potential is moderate. The depth to bedrock ranges from 20 to 40 inches.

Included with these soils in mapping are small areas of Beasley, Fairmount, Shrouts, and Woolper soils and small areas of soils that are similar to the Cynthiana soil but are less than 10 inches deep over bedrock. These included soils are in landscape positions similar to those of the Cynthiana and Faywood soils. Also included are small areas of soils that are similar to the Faywood soil but are redder in the upper part of the subsoil. Included soils make up about 10 percent of this map unit.

The Cynthiana and Faywood soils are used mainly as pasture or unimproved woodland. A few small areas are used for hay. These soils generally are not suited to cultivated crops because of the slope, the depth to bedrock, the rock outcrop, and a very severe hazard of erosion.

Because mowing and renovation are difficult, these soils are poorly suited to hay. They are best suited to permanent pasture or woodland. The species selected for planting should be those that provide adequate forage and can withstand the droughtiness caused by the limited rooting depth. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, and control of undesirable vegetation.

These soils are suited to woodland. Chinkapin oak, eastern redcedar, white ash, and white oak are the most common trees. The trees preferred for planting include white ash and white oak. Table 7 provides specific information relating to potential productivity. The main management concerns are plant competition, an equipment limitation, the hazard of erosion, and seedling mortality. Reforestation can be severely limited

because of competition from undesirable understory plants.

These soils are poorly suited to urban uses. The slope, the moderately slow or slow permeability, the depth to bedrock, the content of clay, the common flagstones, the rock outcrop, low strength, and the moderate shrink-swell potential are limitations. Overcoming these limitations is difficult and expensive.

The capability subclass is Vls.

EdD2—Eden silty clay loam, 6 to 20 percent slopes, eroded. This moderately deep, well drained, sloping and moderately steep soil is on long, narrow, convex ridgetops and the upper side slopes in the western part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Areas are about 5 to 200 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 3 inches; brown silty clay loam

Subsurface layer:

3 to 7 inches; brown and yellowish brown flaggy silty clay

Subsoil:

7 to 16 inches; yellowish brown flaggy clay
16 to 28 inches; light olive brown, mottled very flaggy silty clay

Bedrock:

28 inches; interbedded shale and limestone

This soil is medium in natural fertility and low in organic matter content. Permeability is slow, and available water capacity is moderate. The root zone is moderately deep. Surface runoff is rapid. Tilth is poor because the surface layer is mixed with the clayey subsoil. The shrink-swell potential is moderate. The depth to weathered bedrock of interbedded shale and limestone ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Faywood, Lowell, Nicholson, and Sandview soils. These soils are in landscape positions similar to those of the Eden soil. Also included are some small areas of soils that are similar to the Eden soil but have a browner subsoil, some small areas of soils along the Licking River that have a loamy surface layer, and areas of Eden soils that have a surface layer of flaggy silty clay loam. Included soils make up about 10 to 20 percent of this map unit.

Most areas of the Eden soil are used for pasture, hay, or unimproved woodland. A few small areas on ridgetops are used for cultivated crops.

This soil is poorly suited to the cultivated crops

commonly grown in the county. In a few areas tobacco or corn is grown in small fields. The slope is the main limitation. The hazard of erosion is very severe if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover, can withstand droughtiness, and require the least amount of renovation. Management concerns include applications of lime and fertilizer, proper stocking rates, rotation grazing, proper seeding rates and mixtures, and control of undesirable vegetation. The slope hinders mowing and renovation.

This soil is suited to woodland. Black oak, black walnut, chinkapin oak, eastern redcedar, hickory, scarlet oak, white ash, and white oak are the most common trees. The trees preferred for planting include eastern white pine, white ash, and white oak. Table 7 provides specific information relating to potential productivity. The main management concerns are plant competition, an equipment limitation, the hazard of erosion, and seedling mortality. Seedling mortality can be high during periods of low rainfall. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The slope, the depth to bedrock, the content of clay, the common flagstones, and the slow permeability are limitations on sites for most sanitary facilities. The moderate shrink-swell potential, the slope, and the depth to bedrock are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IVe.

EfE2—Eden flaggy silty clay loam, 20 to 35 percent slopes, eroded. This moderately deep, well drained, steep and very steep soil is on side slopes in the western part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Limestone, siltstone, and shale fragments make up about 15 to 25 percent of the surface layer. Areas are about 5 to more than 1,000 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 3 inches; brown flaggy silty clay loam

Subsurface layer:

3 to 7 inches; brown and yellowish brown flaggy silty clay

Subsoil:

7 to 16 inches; yellowish brown flaggy clay

16 to 28 inches; light olive brown, mottled very flaggy silty clay

Bedrock:

28 inches; interbedded shale and limestone

This soil is medium in natural fertility and low in organic matter content. Permeability is slow, and available water capacity is moderate. The root zone is moderately deep. Surface runoff is rapid. The shrink-swell potential is moderate. The depth to weathered bedrock of interbedded shale and limestone ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Fairmount, Faywood, Lowell, and Woolper soils. These soils are in landscape positions similar to those of the Eden soil. Also included are small areas of Eden soils that have slopes of more than 35 percent, a few areas of soils that are severely eroded, and areas of soils that are similar to the Eden soil but have a browner subsoil. Included soils make up about 10 to 15 percent of this map unit.

Most areas of the Eden soil are used as low-quality pasture (fig. 9) or woodland. This soil is generally unsuited to cultivated crops and hay because of the slope, the common flagstones, and a very severe hazard of erosion. The slope and the common flagstones restrict the use of farm machinery.

In most areas this soil is suited to permanent pasture. Areas that have slopes of more than 30 percent, however, are poorly suited to pasture and are better suited to woodland. The slope and the common flagstones restrict the use of machinery. The species selected for planting should be those that provide high-quality forage and an adequate ground cover, can withstand droughtiness, and require the least amount of renovation. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, and control of undesirable vegetation.

This soil is suited to woodland. Black oak, black walnut, chinkapin oak, eastern redcedar, hickory, scarlet oak, white ash, and white oak are the most common trees. The trees preferred for planting include eastern white pine, white ash, and white oak. Table 7 provides specific information relating to potential productivity. The main management concerns are plant competition, an equipment limitation, the hazard of erosion, and

seedling mortality. Seedling mortality can be high during periods of low rainfall. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The slope, the depth to bedrock, the content of clay, the common flagstones, and the slow permeability are limitations on sites for most sanitary facilities. The moderate shrink-swell potential and the slope are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Overcoming these limitations is difficult and expensive.

The capability subclass is VIe.

EkB—Elk silt loam, 2 to 6 percent slopes. This very deep, well drained, gently sloping soil is on terraces along the larger streams throughout the county and, to a minor extent, in areas of older terrace deposits on uplands in the southern part of the county. Areas are about 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; dark yellowish brown silt loam

Subsoil:

8 to 14 inches; dark yellowish brown silt loam

14 to 54 inches; dark yellowish brown silty clay loam

Substratum:

54 to 78 inches; dark yellowish brown and yellowish brown silty clay loam

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate, and available water capacity is high. The root zone is very deep. Surface runoff is medium. Tilth is good. The soil can be worked throughout a wide range in moisture content.

Included with this soil in mapping are small areas of Allegheny, Boonesboro, Monongahela, Morehead, Otwell, and Woolper soils. These soils are in landscape positions similar to those of the Elk soil. Also included are small areas of Newark and Nolin soils on flood plains; small areas of soils that are similar to the Elk soil but have a darker surface layer, have a clayey subsoil, or are moderately well drained; and, on low stream terraces, a few areas of Elk soils that are subject to rare flooding. Included soils make up about 10 to 15 percent of this map unit.

Most areas of the Elk soil are used for cultivated crops, hay, or pasture. A few small areas are wooded.

This soil is well suited to the cultivated crops



Figure 9.—A pastured area of Eden flaggy silty clay loam, 20 to 35 percent slopes, eroded.

commonly grown in the county. The hazard of erosion is moderate if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and control erosion. A permanent plant cover reduces the hazard of erosion in drainageways. In some areas diversions can

help to control runoff and the deposition of overwash from the adjacent upland side slopes.

This soil is well suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. The species that can withstand brief periods of flooding should be selected for planting in the low included areas. Pasture renovation should be frequent enough to maintain the desired species. Management

concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. American sycamore, black walnut, hackberry, pin oak, red maple, and yellow-poplar are the most common trees. The trees preferred for planting include black walnut, eastern white pine, northern red oak, shortleaf pine, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is well suited to most urban uses. The slope and the content of clay are limitations affecting some sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. The included soils in low areas and on flood plains are limited by flooding. Good design and proper installation procedures can minimize or overcome these limitations.

The capability subclass is IIe.

EkC—Elk silt loam, 6 to 12 percent slopes. This very deep, well drained, sloping soil is on terraces along the larger streams throughout the county and, to a minor extent, in areas of older terrace deposits on uplands in the southern part of the county. Areas are about 5 to 60 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; dark yellowish brown silt loam

Subsoil:

8 to 14 inches; dark yellowish brown silt loam

14 to 54 inches; dark yellowish brown silty clay loam

Substratum:

54 to 78 inches; dark yellowish brown and yellowish brown silty clay loam

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate, and available water capacity is high. The root zone is very deep. Surface runoff is medium. Tilth is good. The soil can be worked throughout a wide range in moisture content.

Included with this soil in mapping are small areas of Allegheny, Boonesboro, Monongahela, Morehead, Otwell, and Woolper soils. These soils are in landscape positions similar to those of the Elk soil. Also included are small areas of Newark and Nolin soils on flood

plains and in depressions and small areas of soils that are similar to the Elk soil but have a darker surface layer, have a clayey subsoil, or are moderately well drained. Included soils make up about 10 to 15 percent of this map unit.

Most areas of the Elk soil are used for cultivated crops, hay, or pasture. A few small areas are wooded.

This soil is suited to the cultivated crops commonly grown in the county. The slope is the main limitation. The hazard of erosion is severe if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways. In some areas diversions can help to control runoff and the deposition of overwash from the adjacent upland side slopes.

This soil is well suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. American sycamore, black walnut, hackberry, pin oak, red maple, and yellow-poplar are the most common trees. The trees preferred for planting include black walnut, eastern white pine, northern red oak, shortleaf pine, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to most urban uses. The slope and the content of clay are limitations affecting some sanitary facilities and most kinds of building site development. Low strength is a limitation on sites for local roads and streets. The included soils on flood plains are limited by flooding. Good design and proper installation procedures can minimize or overcome these limitations.

The capability subclass is IIIe.

FaF—Fairmount-Woolper complex, very rocky, 20 to 60 percent slopes. These shallow or very deep, well drained, steep and very steep soils are on bluffs above the larger streams in the western half of the county and on side slopes in the southern part of the county. Rock

outcrop and soils that are less than 5 inches deep over bedrock make up about 9 percent of this unit. Limestone flagstones cover about 5 to 20 percent of the surface. Areas are about 5 to more than 100 acres in size. The two soils occur as areas so closely intermingled that they could not be mapped separately at the scale selected for mapping.

The Fairmount soil makes up about 50 percent of this unit, and the Woolper soil makes up about 30 percent. Included soils and rock outcrop make up the rest.

The typical sequence, depth, and composition of the layers of the Fairmount soil are as follows—

Surface layer:

0 to 2 inches; very dark grayish brown flaggy silty clay loam

Subsurface layer:

2 to 6 inches; dark brown flaggy silty clay loam

Subsoil:

6 to 16 inches; dark yellowish brown flaggy clay

Bedrock:

16 inches; hard limestone

The Fairmount soil is medium in natural fertility and high in organic matter content. Permeability is slow or moderately slow, and available water capacity is low. The root zone is shallow. Surface runoff is rapid or very rapid. The shrink-swell potential is moderate. The depth to hard limestone bedrock ranges from 10 to 20 inches.

The typical sequence, depth, and composition of the layers of the Woolper soil are as follows—

Surface layer:

0 to 15 inches; dark brown silt loam

Subsurface layer:

15 to 23 inches; dark yellowish brown silt loam

Subsoil:

23 to 28 inches; strong brown silty clay loam

28 to 34 inches; dark yellowish brown silty clay

34 to 48 inches; dark yellowish brown, mottled clay

Substratum:

48 to 62 inches; dark yellowish brown clay

The Woolper soil is medium in natural fertility and high in organic matter content. Permeability is moderately slow or slow, and available water capacity is high. The root zone is very deep. Surface runoff is rapid. The shrink-swell potential is moderate.

Included with these soils in mapping are small areas of Faywood and Lowell soils. These included soils are in landscape positions similar to those of the Fairmount and Woolper soils. Also included are small areas of a soil that is similar to the Woolper soil but is moderately

deep over bedrock; a few areas of soils that have slopes of more than 60 percent; and, below areas of upland stream terrace deposits, soils that have rounded gravel and loamy textures in the surface layer. Included soils make up about 20 percent of this map unit.

The Fairmount and Woolper soils are used as woodland or pasture. They are generally unsuited to cultivated crops and hay because of the slope, the depth to bedrock, the rock outcrop, droughtiness, the common limestone flagstones on the surface, and a very severe hazard of erosion.

These soils are poorly suited to pasture. Areas where slopes are more than 30 percent are better suited to woodland than to pasture. The slope, the depth to bedrock, the rock outcrop, and the common flagstones are limitations.

These soils are suited to woodland. Black oak, chinkapin oak, eastern redcedar, and hickory are the most common trees. The trees preferred for planting include white ash and white oak. Table 7 provides specific information relating to potential productivity.

The main concerns in managing woodland are the hazard of erosion, an equipment limitation, seedling mortality, and plant competition. Steep skid trails and logging roads are subject to rilling and gulying unless they are protected by adequate water bars or a plant cover, or both. The slope restricts the use of wheeled equipment. Careful management of reforestation after the trees are harvested helps to control competition from undesirable understory plants. Seedling mortality can be high during periods of low rainfall.

These soils generally are not suited to urban uses. The slope, the depth to bedrock, and the rock outcrop are the main limitations. Overcoming these limitations is difficult and expensive.

The capability subclass is VIIe.

FwB—Faywood silt loam, 2 to 6 percent slopes.

This moderately deep, well drained, gently sloping soil is on the moderately wide, convex tops of ridges in the western part of the county. Some areas have small sinkholes. Areas are about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches; brown silt loam

Subsoil:

6 to 12 inches; dark yellowish brown silty clay

12 to 35 inches; yellowish brown clay

Bedrock:

35 inches; hard limestone

This soil is medium in natural fertility and moderate in

organic matter content. Permeability is moderately slow or slow, and available water capacity is moderate. The root zone is moderately deep. Surface runoff is medium. Tilth is good. The soil can be worked throughout a wide range in moisture content. The shrink-swell potential is moderate. The depth to limestone bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Beasley, Crider, Cynthiana, Eden, Lowell, Nicholson, and Sandview soils. These soils are in landscape positions similar to those of the Faywood soil. Also included are some small areas of a soil that is similar to the Faywood soil but is redder in the upper part of the subsoil and some small areas of soils near the Licking River that are similar to the Faywood soil but have a loamy surface layer. Included soils make up about 10 to 15 percent of this map unit.

Most areas of the Faywood soil are used for cultivated crops, hay, or pasture. Some areas are used for urban or residential development. A few areas are wooded.

This soil is well suited to the cultivated crops commonly grown in the county. The hazard of erosion is moderate if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and control erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is well suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is suited to woodland. Chinkapin oak, hickory, northern red oak, scarlet oak, sugar maple, white ash, and white oak are the most common trees. The trees preferred for planting include eastern white pine, northern red oak, white ash, and white oak. Table 7 provides specific information relating to potential productivity. The main management concerns are plant competition and an equipment limitation. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The depth to bedrock, the content of clay, and the moderately slow or slow permeability are limitations on sites for most sanitary facilities. The depth to bedrock and the moderate shrink-swell potential are limitations affecting

most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is 11e.

FyC2—Faywood-Lowell silt loams, 6 to 12 percent slopes, eroded. These moderately deep to very deep, well drained, sloping soils are on convex ridgetops and side slopes in the central and western parts of the county. Some areas have small sinkholes or depressions through which water drains. Erosion has removed about 25 to 75 percent of the original surface layer. Areas are about 5 to more than 300 acres in size. The two soils occur as areas so closely intermingled that they could not be mapped separately at the scale selected for mapping.

The Faywood soil makes up about 55 percent of this unit, and the Lowell soil makes up about 25 percent. Included soils make up the rest.

The typical sequence, depth, and composition of the layers of the Faywood soil are as follows—

Surface layer:

0 to 5 inches; brown silt loam

Subsoil:

5 to 11 inches; dark yellowish brown silty clay

11 to 34 inches; yellowish brown clay

Bedrock:

34 inches; hard limestone

The Faywood soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow or slow, and available water capacity is moderate. The root zone is moderately deep. Surface runoff is medium. Tilth is only fair because the surface layer is mixed with the clayey subsoil. The shrink-swell potential is moderate. The depth to limestone bedrock ranges from 20 to 40 inches.

The typical sequence, depth, and composition of the layers of the Lowell soil are as follows—

Surface layer:

0 to 5 inches; dark yellowish brown silt loam

Subsoil:

5 to 23 inches; strong brown and yellowish brown silty clay loam and silty clay

23 to 45 inches; yellowish brown clay that has mottles in the lower part

Substratum:

45 to 60 inches; olive yellow clay

The Lowell soil is medium in natural fertility and moderate in organic matter content. Permeability is

moderately slow, and available water capacity is high. The root zone is deep or very deep. Surface runoff is medium. Tilth is only fair because the surface layer is mixed with the clayey subsoil. The shrink-swell potential is moderate.

Included with these soils in mapping are small areas of Beasley, Cynthiana, Eden, Nicholson, and Sandview soils. These included soils are in landscape positions similar to the Faywood and Lowell soils. Also included are small areas of a soil that is similar to the Faywood soil but is redder in the upper part of the subsoil and small areas of soils near the Licking River that are similar to the Faywood soil but have a loamy surface layer. Included soils make up about 20 percent of this map unit.

Most areas of the Faywood and Lowell soils are used for pasture, hay, or cultivated crops. Some areas are wooded or covered with low-quality brush and eastern redcedar.

These soils are suited to the cultivated crops commonly grown in the county. The slope is the main limitation. The hazard of erosion is severe if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, returning crop residue to the soils, growing cover crops, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and help control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

These soils are well suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

These soils are well suited to woodland. Hickory, northern red oak, and white ash are the most common trees. The trees preferred for planting include eastern white pine, northern red oak, white ash, and white oak. Table 7 provides specific information relating to potential productivity. The main management concerns are plant competition and an equipment limitation. Reforestation can be severely limited because of competition from undesirable understory plants.

These soils are suited to some urban uses. The slope, the content of clay, the depth to bedrock, and the moderate shrink-swell potential are limitations affecting most kinds of building site development. The slope, the content of clay, the depth to bedrock, and the moderately slow or slow permeability are limitations on sites for most sanitary facilities. Low strength is a

limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIIe.

FyD2—Faywood-Lowell silt loams, 12 to 20 percent slopes, eroded. These moderately deep to very deep, well drained, moderately steep soils are on side slopes in the central and western parts of the county. A few areas have small sinkholes or depressions through which water drains. Erosion has removed about 25 to 75 percent of the original surface layer. Areas are about 5 to more than 200 acres in size. The two soils occur as areas so closely intermingled that they could not be mapped separately at the scale selected for mapping.

The Faywood soil makes up about 45 percent of this unit, and the Lowell soil makes up about 40 percent. Included soils make up the rest.

The typical sequence, depth, and composition of the layers of the Faywood soil are as follows—

Surface layer:

0 to 5 inches; brown silt loam

Subsoil:

5 to 11 inches; dark yellowish brown silty clay
11 to 34 inches; yellowish brown clay

Bedrock:

34 inches; hard limestone

The Faywood soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow or slow, and available water capacity is moderate. The root zone is moderately deep. Surface runoff is rapid. Tilth is only fair because the surface layer is mixed with the clayey subsoil. The shrink-swell potential is moderate. The depth to limestone bedrock ranges from 20 to 40 inches.

The typical sequence, depth, and composition of the layers of the Lowell soil are as follows—

Surface layer:

0 to 5 inches; dark yellowish brown silt loam

Subsoil:

5 to 23 inches; strong brown and yellowish brown silty clay loam and silty clay
23 to 45 inches; yellowish brown clay that has mottles in the lower part

Substratum:

45 to 60 inches; olive yellow clay

The Lowell soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow, and available water capacity is high.

The root zone is deep or very deep. Surface runoff is rapid. Tilth is only fair because the surface layer is mixed with the clayey subsoil. The shrink-swell potential is moderate.

Included with these soils in mapping are small areas of Beasley, Cynthiana, and Eden soils. These included soils are in landscape positions similar to those of the Faywood and Lowell soils. Also included are small areas of a soil that is similar to the Faywood soil but is redder in the upper part of the subsoil. Included soils make up about 15 percent of this map unit.

Most areas of the Faywood and Lowell soils are used for pasture, hay, or woodland. A few areas are used for cultivated crops.

These soils are suited to occasional cultivation but are better suited to hay and pasture. The slope is the main limitation. The hazard of erosion is very severe if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, returning crop residue to the soils, growing cover crops, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

These soils are suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

These soils are well suited to woodland. Hickory, northern red oak, and white ash are the most common trees. The trees preferred for planting include eastern white pine, northern red oak, white ash, and white oak. Table 7 provides specific information relating to potential productivity. The main management concerns are plant competition, the hazard of erosion, and an equipment limitation. Reforestation can be severely limited because of competition from undesirable understory plants.

These soils are poorly suited to urban uses. The slope, the content of clay, and the depth to bedrock are limitations affecting most kinds of building site development. The slope, the content of clay, the depth to bedrock, and the moderately slow or slow permeability are limitations on sites for most sanitary facilities. Low strength and the slope are limitations on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IVe.

La—Lawrence silt loam. This very deep, somewhat poorly drained, nearly level soil is in slightly concave areas on broad uplands and on stream terraces below the Knobs area in the central and northern parts of the county. Slopes range from 0 to 2 percent. Areas are about 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; yellowish brown silt loam

Subsoil:

8 to 24 inches; light yellowish brown and brownish yellow, mottled silt loam and silty clay loam

24 to 52 inches; a fragipan of light yellowish brown, yellowish brown, and pale brown silty clay loam

52 to 64 inches; pale brown, yellowish brown, and light gray silty clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate above the fragipan and slow in the fragipan. Available water capacity is moderate. Surface runoff is slow. The seasonal high water table is at a depth of 12 to 24 inches. Tilth is good, but the optimum moisture range for cultivation is limited. The root zone is only moderately deep because of the fragipan.

Included with this soil in mapping are small areas of Beasley, McGary, and Nicholson soils. These soils are in landscape positions similar to those of the Lawrence soil. Also included are some small areas of soils that are similar to the Lawrence soil but do not have a fragipan and a few areas of Lawrence soils that have slopes of 2 to 4 percent. Included soils make up about 5 to 15 percent of this map unit.

Most areas of the Lawrence soil are used for hay and pasture. Some areas are used for cultivated crops. A few areas are wooded.

This soil is suited to most of the cultivated crops commonly grown in the county. It can be cropped intensively without significant soil loss. The seasonal high water table is the main limitation. Tobacco and deep-rooted plants can be damaged during wet periods. Applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth and maintain the content of organic matter.

This soil is suited to hay and pasture. Deep-rooted plants, such as alfalfa, can be damaged during wet periods because of the seasonal high water table. The species selected for planting should be those that provide high-quality forage and can withstand short periods of wetness. Pasture renovation should be frequent enough to maintain the desired species.

Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black oak, hackberry, pin oak, red maple, sweetgum, and yellow-poplar are the most common trees. The trees preferred for planting include American sycamore, eastern white pine, sweetgum, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concerns are an equipment limitation, seedling mortality, and plant competition. The seedling survival rate is only moderate because of the seasonal high water table. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The wetness and the slow permeability in the fragipan are limitations on sites for most sanitary facilities. The wetness is a limitation affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIIw.

LoB—Lowell silt loam, 2 to 6 percent slopes. This deep and very deep, well drained, gently sloping soil is on the convex tops of ridges in the central and western parts of the county. A few areas have small sinkholes or depressions through which water drains. Areas are about 5 to more than 170 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 7 inches; dark yellowish brown silt loam

Subsoil:

7 to 25 inches; strong brown, dark yellowish brown, and yellowish brown silty clay loam and silty clay
25 to 47 inches; yellowish brown clay that has mottles in the lower part

Substratum:

47 to 60 inches; olive yellow clay

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow, and available water capacity is high. The root zone is deep or very deep. Surface runoff is medium. Tilth is good. The soil can be worked throughout a wide range in moisture content. The shrink-swell potential is moderate.

Included with this soil in mapping are small areas of Beasley, Crider, Cynthiana, Eden, Faywood, Nicholson,

and Sandview soils. These soils are in landscape positions similar to those of the Lowell soil. Also included, near the Licking River, are some small areas of soils that are similar to the Lowell soil but have a loamy surface layer. Included soils make up about 10 percent of this map unit.

Most areas of the Lowell soil are used for cultivated crops, hay, or pasture. Many areas are used for residential or urban development. A few areas are wooded.

This soil is well suited to the cultivated crops commonly grown in the county. The hazard of erosion is moderate if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and control erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is well suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black locust, black oak, chinkapin oak, hickory, northern red oak, sugar maple, and white ash are the most common trees. The trees preferred for planting include eastern white pine, northern red oak, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The content of clay, the depth to bedrock, and the moderately slow permeability are limitations on sites for most sanitary facilities. The content of clay, the depth to bedrock, and the moderately slow permeability are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIe.

LoC—Lowell silt loam, 6 to 12 percent slopes. This deep and very deep, well drained, gently sloping soil is on convex ridgetops and side slopes in the central and western parts of the county. A few areas have small sinkholes or depressions through which water drains.

Areas are about 5 to more than 250 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 7 inches; dark yellowish brown silt loam

Subsoil:

7 to 25 inches; strong brown, dark yellowish brown, and yellowish brown silty clay loam and silty clay
25 to 47 inches; yellowish brown clay that has mottles in the lower part

Substratum:

47 to 60 inches; olive yellow clay

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow, and available water capacity is high. The root zone is deep or very deep. Surface runoff is rapid. Tilth is good. The soil can be worked throughout a wide range in moisture content. The shrink-swell potential is moderate.

Included with this soil in mapping are small areas of Beasley, Crider, Cynthiana, Eden, Faywood, Nicholson, and Sandview soils. These soils are in landscape positions similar to those of the Lowell soil. They make up about 10 percent of this map unit.

Most areas of the Lowell soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is suited to the cultivated crops commonly grown in the county. The slope is the main limitation. The hazard of erosion is severe if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is well suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include applications of lime and fertilizer, proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black locust, black oak, chinkapin oak, hickory, northern red oak, sugar maple, and white ash are the most common trees. The trees preferred for planting include eastern white pine, northern red oak, white ash, white oak, and yellow-poplar. Table 7 provides specific information

relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The content of clay, the depth to bedrock, the slope, and the moderately slow permeability are limitations on sites for most sanitary facilities. The moderate shrink-swell potential is a limitation affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIIe.

LoD2—Lowell silt loam, 12 to 20 percent slopes, eroded. This deep and very deep, well drained, moderately steep soil is on narrow, convex ridgetops and the upper side slopes in the central and western parts of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Areas are about 5 to 70 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 5 inches; dark yellowish brown silt loam

Subsoil:

5 to 23 inches; strong brown, dark yellowish brown, and yellowish brown silty clay loam and silty clay
23 to 45 inches; yellowish brown clay that has mottles in the lower part

Substratum:

45 to 60 inches; olive yellow clay

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow, and available water capacity is high. The root zone is deep or very deep. Surface runoff is rapid. Tilth is only fair because the surface layer is mixed with the clayey subsoil. The shrink-swell potential is moderate.

Included with this soil in mapping are small areas of Beasley, Eden, and Faywood soils. These soils are in landscape positions similar to those of the Lowell soil. They make up about 10 percent of this map unit.

Most areas of the Lowell soil are used for pasture and hay. Some small areas are used for cultivated crops. A few areas are wooded.

This soil is suited to occasional cultivation, but it is better suited to pasture and hay. The slope is the main limitation. The hazard of erosion is very severe if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil,

and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is well suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black locust, black oak, chinkapin oak, hickory, northern red oak, sugar maple, and white ash are the most common trees. The trees preferred for planting include eastern white pine, northern red oak, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concerns are an equipment limitation, the hazard of erosion, and plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The content of clay, the depth to bedrock, the slope, and the moderately slow permeability are limitations on sites for most sanitary facilities. The slope is the main limitation affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IVe.

Ma—McGary silt loam. This deep, somewhat poorly drained, nearly level soil is in slightly concave areas on broad uplands below the Knobs area in the central and northern parts of the county. Slopes range from 0 to 2 percent. Areas are about 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; brown silt loam

Subsoil:

8 to 14 inches; brownish yellow, mottled silty clay loam

14 to 26 inches; yellowish brown and light olive gray, mottled silty clay

26 to 39 inches; light gray, light olive gray, and yellowish brown silty clay

Substratum:

39 to 48 inches; reddish yellow, mottled clay

Bedrock:

48 to 54 inches; layered, soft, calcareous shale and dolomite

This soil is medium in natural fertility and moderate in organic matter content. Permeability is slow or very slow, and available water capacity is high. The root zone is deep. Surface runoff is slow. The seasonal high water is at a depth of 12 to 36 inches. Tilth is good, but the optimum moisture range for cultivation is limited. The shrink-swell potential is high.

Included with this soil in mapping are small areas of Beasley, Lawrence, and Nicholson soils. These soils are in landscape positions similar to those of the McGary soil. Also included are some small areas of soils that are similar to the McGary soil but have more silt in the subsoil. Included soils make up about 10 percent of this map unit.

Most areas of the McGary soil are used for hay and pasture. Some areas are used for cultivated crops. A few areas are wooded.

This soil is suited to most of the cultivated crops commonly grown in the county. It can be cropped intensively without significant soil loss. The seasonal high water table is the main limitation. Tobacco and deep-rooted plants can be damaged during wet periods. Tillage may be delayed in the spring because of the wetness. Applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth and maintain the organic matter content.

This soil is suited to hay and pasture. Deep-rooted plants, such as alfalfa, can be damaged during wet periods because of the seasonal high water table. The species selected for planting should be those that provide high-quality forage and can withstand short periods of wetness. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Green ash, hackberry, hickory, pin oak, post oak, red maple, and sweetgum are the most common trees. The trees preferred for planting include American sycamore, eastern white pine, green ash, and pin oak. Table 7 provides specific information relating to potential productivity. The main management concerns are an equipment limitation and plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The

wetness, the high shrink-swell potential, the slow or very slow permeability, the content of clay, and low strength are limitations. Overcoming these limitations may be difficult and expensive.

The capability subclass is IIIw.

Me—Melvin silt loam, frequently flooded. This very deep, poorly drained, nearly level soil is on flood plains in the eastern and southern parts of the county. Slopes range from 0 to 2 percent. Areas are about 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches; brown, mottled silt loam

Subsoil:

6 to 20 inches; light brownish gray, mottled silt loam

Substratum:

20 to 62 inches; light brownish gray, mottled silt loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and available water capacity is high. The root zone is very deep. Surface runoff is very slow. The seasonal high water table is within a depth of 12 inches for long periods in winter and spring. The soil is frequently flooded in winter and spring. Tilth is good, but the optimum moisture range for cultivation is limited.

Included with this soil in mapping are small areas of Lawrence, Melvin, Morehead, and Newark soils. Newark soils are in landscape positions similar to those of the Melvin soil. Lawrence and Morehead soils are on stream terraces. Also included are small areas of Melvin soils that are subject to ponding and small areas of soils that are similar to the Melvin soil but have more gravel in the subsoil or are more acid. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Melvin soil are used for hay and pasture. A few of the included areas that are subject to ponding are wooded (fig. 10).

If drained, this soil is suited to most of the cultivated crops commonly grown in the county. It can be cropped intensively without significant soil loss. The wetness and the flooding are the main management concerns. In drained areas applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth and maintain the content of organic matter.

If drained, this soil is suited to hay and pasture. The species selected for planting should be those that can withstand wetness and brief periods of flooding. Pasture

renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. American sycamore, black willow, green ash, hackberry, hickory, pin oak, red maple, and sweetgum are the most common trees. The trees preferred for planting include American sycamore, eastern cottonwood, loblolly pine, pin oak, and sweetgum. Table 7 provides specific information relating to potential productivity. The main management concerns are an equipment limitation, seedling mortality, and plant competition. The seedling survival rate is only moderate because of the seasonal high water table. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is poorly suited to most urban uses because of the wetness, the hazard of flooding, and low strength. Overcoming these limitations is difficult.

The capability subclass is IIIw.

MgB—Monongahela loam, 2 to 6 percent slopes.

This very deep, moderately well drained, gently sloping soil is on stream terraces and in areas of older terrace deposits on high ridges along the Licking River in the southern part of the county. Areas are about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; brown loam

Subsoil:

8 to 25 inches; yellowish brown and brownish yellow silt loam that has mottles in the lower part
25 to 40 inches; a fragipan of brownish yellow, mottled silt loam

40 to 72 inches; brownish yellow and light gray, mottled silty clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate above the fragipan and moderately slow or slow in the fragipan. Available water capacity is moderate. Surface runoff is medium. The seasonal high water table is at a depth of 18 to 36 inches. Tilth is good. The soil can be worked throughout a wide range in moisture content. The root zone is only moderately deep because of the fragipan.

Included with this soil in mapping are small areas of Allegheny, Elk, Lawrence, Newark, and Nolin soils. Allegheny, Elk, and Lawrence soils are in landscape positions similar to those of the Monongahela soil.



Figure 10.—A wooded area of Melvin silt loam, frequently flooded.

Newark and Nolin soils are in depressions and along drainageways. Also included are some low areas of Monongahela soils that are subject to flooding in late winter or early spring. Included soils make up about 10 to 15 percent of this map unit.

Most areas of the Monongahela soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is suited to most of the cultivated crops commonly grown in the county. The seasonal high water table and the fragipan are limitations. Planting and harvesting are sometimes delayed by the wetness. The hazard of erosion is moderate if conventional tillage

is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and control erosion. A permanent plant cover reduces the hazard of erosion in drainageways. In some areas diversions can help to control runoff and the deposition of overwash from the adjacent upland side slopes.

This soil is suited to hay and pasture, but the fragipan restricts the rooting depth and limits forage production during dry periods. The plants that have moderately deep rooting systems and can withstand

seasonal wetness grow best. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black walnut, northern red oak, white ash, and yellow-poplar are the most common trees. The trees preferred for planting include eastern white pine, northern red oak, shortleaf pine, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The wetness and the moderately slow or slow permeability in the fragipan are limitations on sites for most sanitary facilities. The wetness is the main limitation affecting most kinds of building site development. Low strength and the wetness are limitations on sites for local roads and streets. Flooding is a hazard in the low included areas. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIe.

MgC—Monongahela loam, 6 to 12 percent slopes.

This very deep, moderately well drained, sloping soil is on stream terraces and in areas of older terrace deposits on high ridges along the Licking River in the southern part of the county. Areas are about 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; brown loam

Subsoil:

8 to 25 inches; yellowish brown and brownish

yellow silt loam that has mottles in the lower part

25 to 40 inches; a fragipan of brownish yellow, mottled silt loam

40 to 72 inches; brownish yellow and light gray, mottled silty clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate above the fragipan and moderately slow or slow in the fragipan. Available water capacity is moderate. Surface runoff is medium. The seasonal high water table is at a depth of 18 to 36 inches. Tilth is good. The soil can be worked throughout a wide range in moisture content.

The root zone is only moderately deep because of the fragipan.

Included with this soil in mapping are small areas of Allegheny and Elk soils. These soils are in landscape positions similar to those of the Monongahela soil. They make up about 10 to 15 percent of this map unit.

Most areas of the Monongahela soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is suited to most of the cultivated crops commonly grown in the county. The slope is the main limitation. The hazard of erosion is severe if conventional tillage is used. The root zone is restricted by the fragipan. The crops that have moderately deep rooting systems and can withstand slight wetness grow best. Farming on the contour, strip cropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways. In some areas diversions can help to control runoff and the deposition of overwash from the adjacent upland side slopes.

This soil is suited to hay and pasture, but the fragipan restricts the rooting depth and limits forage production during dry periods. The plants that have moderately deep rooting systems and can withstand seasonal wetness grow best. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black walnut, northern red oak, white ash, and yellow-poplar are the most common trees. The trees preferred for planting include eastern white pine, northern red oak, shortleaf pine, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The wetness, the slope, and the moderately slow or slow permeability in the fragipan are limitations on sites for most sanitary facilities. The slope and the wetness are limitations affecting most kinds of building site development. Low strength, the slope, and the wetness are limitations on sites for local roads and streets. Good design and

proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIIe.

Mo—Morehead silt loam, rarely flooded. This very deep, somewhat poorly drained or moderately well drained, nearly level soil is on stream terraces in the eastern and southern parts of the county. Slopes range from 0 to 2 percent. Areas are about 5 to more than 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 10 inches; dark yellowish brown silt loam

Subsoil:

10 to 58 inches; yellowish brown and brownish yellow, mottled silty clay loam

Substratum:

58 to 95 inches; yellowish brown, mottled silt loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and available water capacity is high. The root zone is very deep. Surface runoff is very slow. The seasonal high water table is at a depth of 6 to 30 inches. Tilth is good, but the optimum moisture range for cultivation is limited. The soil is subject to rare flooding.

Included with this soil in mapping are small areas of Melvin, Newark, Nolin, and Skidmore soils. These soils are on flood plains. They make up about 15 percent of this map unit.

Most areas of the Morehead soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is suited to most of the cultivated crops commonly grown in the county. It can be cropped intensively without significant soil loss. The seasonal high water table is the main limitation. Planting and harvesting may be delayed because of the wetness. The crops that can tolerate wetness grow best. Water-management measures, such as berms and levees, can help to overcome the hazard of flooding, and open ditches and diversions can help to lower the water table. Applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth and maintain the content of organic matter.

This soil is suited to hay and pasture, although some hay crops may be damaged by flooding. The species selected for planting should be those that provide high-quality forage and are tolerant of wetness. Pasture

renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black oak, pin oak, red maple, white oak, and yellow-poplar are the most common trees. The trees preferred for planting include eastern white pine, green ash, pin oak, shortleaf pine, sweetgum, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concerns are an equipment limitation, seedling mortality, and plant competition. The seedling survival rate is only moderate because of the seasonal high water table. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The wetness, the hazard of flooding, and low strength are management concerns. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIw.

MsB2—Muse channery silt loam, 2 to 6 percent slopes, eroded. This deep and very deep, well drained, gently sloping soil is on foot slopes and fan areas along intermittent streams in the eastern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Areas are about 5 to 10 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 3 inches; dark brown channery silt loam

Subsoil:

3 to 11 inches; strong brown silty clay

11 to 39 inches; yellowish red very channery clay and clay

39 to 46 inches; yellowish brown silty clay

Substratum:

46 to 59 inches; red, brownish yellow, and light gray channery silty clay

Bedrock:

59 inches; hard, black shale

This soil is medium in natural fertility and moderate in organic matter content. Permeability is slow, and available water capacity is high. The seasonal high water table is at a depth of 48 to 72 inches. The root zone is deep or very deep. Surface runoff is medium. Tilth is only fair because the surface layer is mixed with

the clayey subsoil. The shrink-swell potential is moderate. The depth to black shale bedrock is more than 40 inches.

Included with this soil in mapping are small areas of Shelocta and Shrouts soils. These soils are in landscape positions similar to those of the Muse soil. Also included are some small areas of soils that are similar to the Muse soil but are moderately well drained. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Muse soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is suited to the cultivated crops commonly grown in the county. The hazard of erosion is moderate if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and control erosion. A permanent plant cover reduces the hazard of erosion in drainageways. In some areas diversions can help to control the deposition of overwash from the adjacent upland side slopes.

This soil is suited to hay and pasture. Because of the content of clay in the soil, however, the pasture can be damaged if it is grazed during wet periods. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black oak, red maple, shortleaf pine, Virginia pine, white oak, and yellow-poplar are the most common trees. The trees preferred for planting include eastern white pine, shortleaf pine, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The wetness, the content of clay, the depth to bedrock, and the slow permeability are limitations on sites for most sanitary facilities. The wetness, the content of clay, and the moderate shrink-swell potential are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIe.

MsC2—Muse channery silt loam, 6 to 12 percent slopes, eroded. This deep and very deep, well drained, sloping soil is on foot slopes and side slopes along intermittent streams in the eastern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Areas are about 5 to 10 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 3 inches; dark brown channery silt loam

Subsoil:

3 to 11 inches; strong brown silty clay

11 to 39 inches; yellowish red very channery clay and clay

39 to 46 inches; yellowish brown silty clay

Substratum:

46 to 59 inches; red, brownish yellow, and light gray channery silty clay

Bedrock:

59 inches; hard, black shale

This soil is medium in natural fertility and moderate in organic matter content. Permeability is slow, and available water capacity is high. The seasonal high water table is at a depth of 48 to 72 inches. The root zone is deep or very deep. Surface runoff is rapid. Tilth is only fair because the surface layer is mixed with the clayey subsoil. The shrink-swell potential is moderate. The depth to black shale bedrock is more than 40 inches.

Included with this soil in mapping are small areas of Shelocta and Skidmore soils. Shelocta soils are in landscape positions similar to those of the Muse soil. Skidmore soils are on flood plains. Also included are some small areas of soils that are similar to the Muse soil but are less acid in the subsoil. Included soils make up about 10 to 25 percent of this map unit.

Most areas of the Muse soil are used for cultivated crops, hay, or pasture. Some areas are wooded.

This soil is suited to the cultivated crops commonly grown in the county. The slope is the main limitation. The hazard of erosion is severe if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways. In some areas diversions can help to control the deposition of overwash from the adjacent side slopes.

This soil is suited to hay and pasture. Because of the content of clay in the soil, however, the pasture can be damaged if it is grazed during wet periods. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black oak, red maple, shortleaf pine, Virginia pine, white oak, and yellow-poplar are the most common trees. The trees preferred for planting include eastern white pine, shortleaf pine, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The slope, the wetness, the content of clay, the depth to bedrock, and the slow permeability are limitations on sites for most sanitary facilities. The slope, the wetness, the content of clay, and the moderate shrink-swell potential are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIIe.

MsD2—Muse channery silt loam, 12 to 20 percent slopes, eroded. This deep and very deep, well drained, moderately steep soil is on side slopes and foot slopes along intermittent streams in the eastern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Areas are about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 3 inches; dark brown channery silt loam

Subsoil:

3 to 11 inches; strong brown silty clay

11 to 39 inches; yellowish red very channery clay and clay

39 to 46 inches; yellowish brown silty clay

Substratum:

46 to 59 inches; red, brownish yellow, and light gray channery silty clay

Bedrock:

59 inches; hard, black shale

This soil is medium in natural fertility and moderate in organic matter content. Permeability is slow, and available water capacity is high. The seasonal high water table is at a depth of 48 to 72 inches. The root zone is deep or very deep. Surface runoff is rapid. Tilth is only fair because the surface layer is mixed with the clayey subsoil. The shrink-swell potential is moderate. The depth to black shale bedrock is more than 40 inches.

Included with this soil in mapping are small areas of Brownsville, Colyer, Shelocta, Shrouts, Skidmore, and Trappist soils. Brownsville, Colyer, Shelocta, Shrouts, and Trappist soils are in landscape positions similar to those of the Muse soil. Skidmore soils are on flood plains. Also included are some small areas of severely eroded Muse soils and some small areas of Muse soils that have slopes of 20 to 35 percent. Included soils make up about 15 to 25 percent of this map unit.

Most areas of the Muse soil are used for pasture, hay, or woodland. A few areas are used for the production of Christmas trees (fig. 11).

This soil is suited to occasional cultivation, but it is better suited to hay or permanent pasture. The slope is the main limitation. The hazard of erosion is very severe if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is suited to hay and pasture. Because of the content of clay in the soil, however, the pasture can be damaged if it is grazed during wet periods. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black oak, hickory, red maple, scarlet oak, shortleaf pine, Virginia pine, white oak, and yellow-poplar are the most common trees. The trees preferred for planting include eastern white pine, shortleaf pine, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concerns are an equipment limitation, the hazard of



Figure 11.—Pine plantation used for Christmas trees in an area of Muse channery silt loam, 12 to 20 percent slopes, eroded. The woodland in the background is in an area of Muse-Trappist silt loams, 20 to 55 percent slopes, eroded.

erosion, and plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is poorly suited to urban uses. The slope, the slow permeability, the wetness, the content of clay, and the depth to bedrock are limitations on sites for most sanitary facilities. The slope is the main limitation affecting most kinds of building site development. Low strength and the slope are limitations on sites for local

procedures can minimize or overcome some of these limitations.

The capability subclass is IVe.

MtD3—Muse-Shrouds complex, 6 to 20 percent slopes, severely eroded. These very deep to moderately deep, well drained, sloping and moderately steep soils are on side slopes. They are in the eastern part of the county, in areas of contact between highly

shale. Erosion has removed most of the original surface layer and, in places, some of the subsoil. Some areas have rills and shallow gullies. Areas are about 10 to more than 100 acres in size. The two soils occur as areas so closely intermingled that they could not be mapped separately at the scale selected for mapping.

The Muse soil makes up about 50 percent of this unit, and the Shrouts soil makes up about 40 percent. Included soils make up the rest.

The typical sequence, depth, and composition of the layers of the Muse soil are as follows—

Surface layer:

0 to 2 inches; dark brown channery silt loam

Subsoil:

2 to 10 inches; strong brown silty clay

10 to 38 inches; yellowish red very channery clay and clay

38 to 45 inches; yellowish brown silty clay

Substratum:

45 to 58 inches; red, brownish yellow, and light gray channery silty clay

Bedrock:

58 inches; hard, black shale

The Muse soil is medium in natural fertility and low in organic matter content. Permeability is slow, and available water capacity is high. The seasonal high water table is at a depth of 48 to 72 inches. The root zone is deep or very deep. Surface runoff is rapid. The shrink-swell potential is moderate. The depth to black shale bedrock is more than 40 inches.

The typical sequence, depth, and composition of the layers of the Shrouts soil are as follows—

Surface layer:

0 to 4 inches; very dark grayish brown silty clay

Subsoil:

4 to 27 inches; light olive brown, olive, and greenish gray silty clay and clay

Substratum:

27 to 35 inches; yellowish brown, olive, and greenish gray channery clay

Bedrock:

35 to 40 inches; soft, layered, calcareous shale

The Shrouts soil is low in natural fertility and moderate or high in organic matter content. Permeability is slow, and available water capacity is moderate. The root zone is moderately deep. Surface runoff is rapid. The shrink-swell potential is moderate. The depth to soft, calcareous shale bedrock ranges from 20 to 40 inches.

Included with these soils in mapping are small areas of Beasley, Colyer, and Shelocta soils. These included soils are in landscape positions similar to those of the Muse and Shrouts soils. Also included are some small areas of soils that are similar to the Muse soil but are moderately well drained, some areas of Muse soils that have slopes of 20 to 35 percent, and areas of soils that are slightly or moderately eroded. Included soils make up about 10 percent of this map unit.

The Muse and Shrouts soils are used mainly for pasture, hay, or woodland. A few small areas are used for cultivated crops.

These soils are poorly suited to cultivated crops. They are better suited to hay or permanent pasture. The slope and droughtiness are limitations. The hazard of erosion is very severe.

These soils are suited to hay and pasture. Because of the content of clay in the soils, however, the pasture can be damaged if it is grazed during wet periods. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

These soils are well suited to woodland. Black oak, scarlet oak, Virginia pine, and white oak are the most common trees. The trees preferred for planting include eastern white pine, loblolly pine, shortleaf pine, Virginia pine, and white oak. Table 7 provides specific information relating to potential productivity. The main management concerns are an equipment limitation, the hazard of erosion, seedling mortality, and plant competition. Reforestation can be severely limited because of competition from undesirable understory plants. Windthrow of some species of pine is a hazard on the Shrouts soil.

These soils are poorly suited to urban uses. The slope, the slow permeability, the content of clay, the depth to bedrock, low strength, and the moderate shrink-swell potential are limitations. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is Vle.

MuF2—Muse-Trappist silt loams, 20 to 55 percent slopes, eroded. These very deep to moderately deep, well drained, steep and very steep soils are on side slopes and foot slopes in the eastern part of the county. Erosion has removed about 25 to 75 percent of the original surface layer. Areas are about 20 to more than 300 acres in size. The two soils occur as areas so closely intermingled that they could not be mapped

and control erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is suited to hay and pasture, but the fragipan restricts the rooting depth and limits forage production during dry periods. The plants that have moderately deep rooting systems and can withstand slight wetness grow best. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black oak, hickory, northern red oak, sweetgum, white oak, and yellow-poplar are the most common trees. The trees preferred for planting include eastern white pine, northern red oak, sweetgum, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main concerns in managing woodland are the hazard of erosion and plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The wetness, the content of clay, and the slow permeability in the fragipan are limitations on sites for most sanitary facilities. The wetness is a limitation affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIe.

NhC—Nicholson silt loam, 6 to 12 percent slopes.

This very deep, moderately well drained, sloping soil is on broad ridgetops and the upper side slopes in the western, central, and southern parts of the county. Areas are about 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 9 inches; brown silt loam

Subsoil:

9 to 28 inches; yellowish brown silt loam and silty clay loam

28 to 41 inches; a fragipan of yellowish brown, mottled silty clay loam

41 to 54 inches; yellowish brown, mottled clay

Substratum:

54 to 74 inches; yellowish brown, light brownish gray, and strong brown clay

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate above the fragipan and slow in the fragipan. Available water capacity is moderate. Surface runoff is medium. The seasonal high water table is at a depth of 18 to 30 inches. Tilth is good. The soil can be worked throughout a wide range in moisture content. The root zone is only moderately deep because of the fragipan. Limestone or shale bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Beasley, Crider, Faywood, Lowell, and Sandview soils. These soils are in landscape positions similar to the Nicholson soil. They make up about 5 to 15 percent of this map unit.

Most areas of the Nicholson soil are used for hay, pasture, or cultivated crops. A few areas are wooded.

This soil is suited to most of the cultivated crops commonly grown in the county. The slope is the main limitation. The hazard of erosion is severe if conventional tillage is used. The root zone is restricted by the fragipan. The crops that have moderately deep rooting systems and can withstand slight wetness grow best. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is suited to hay and pasture, but the fragipan restricts the rooting depth and limits forage production during dry periods. The plants that have moderately deep rooting systems and can withstand slight wetness grow best. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black oak, hickory, northern red oak, sweetgum, white oak, and yellow-poplar are the most common trees. The trees preferred for planting include eastern white pine, northern red oak, sweetgum, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concerns are the hazard of erosion and plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The wetness,

water table is at a depth of 6 to 18 inches. Tilth is good, but the optimum moisture range for cultivation is limited. The soil is occasionally flooded in winter and early spring.

Included with this soil in mapping are small areas of Lawrence, McGary, Melvin, Morehead, Nolin, Otwell, and Skidmore soils. Melvin, Nolin, and Skidmore soils are in landscape positions similar to those of the Newark soil. Lawrence, McGary, Morehead, and Otwell soils are on low stream terraces. Also included are small areas of soils that are similar to the Newark soil but have more gravel in the subsoil or are more acid. Included soils make up about 10 to 20 percent of this map unit.

Most areas of the Newark soil are used for hay, pasture, or cultivated crops. A few areas are wooded.

If drained, this soil is well suited to the cultivated crops commonly grown in the county. It can be cropped intensively without significant soil loss. The seasonal high water table is a limitation. Planting and harvesting are sometimes delayed by the wetness. In some areas diversions can help to control the deposition of overwash from the adjacent side slopes. Small grain crops are sometimes damaged by flooding in winter and early spring. Applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth and the content of organic matter.

This soil is suited to hay and pasture, although some hay crops may be damaged by flooding. The species selected for planting should be those that provide high-quality forage and can withstand wetness and occasional flooding. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Eastern cottonwood, green ash, pin oak, and sweetgum are the most common trees. The trees preferred for planting include American sycamore, eastern cottonwood, green ash, and sweetgum. Table 7 provides specific information relating to potential productivity. The main management concerns are an equipment limitation, seedling mortality, and plant competition. The seedling survival rate is only moderate because of the seasonal high water table. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is poorly suited to urban uses because of the wetness, the hazard of flooding, and low strength.

Overcoming these limitations is difficult.

The capability subclass is llw.

NhB—Nicholson silt loam, 2 to 6 percent slopes.

This very deep, moderately well drained, gently sloping soil is on the broad tops of ridges in the western, central, and southern parts of the county. Areas are about 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 9 inches; brown silt loam

Subsoil:

9 to 28 inches; yellowish brown silt loam and silty clay loam

28 to 41 inches; a fragipan of yellowish brown, mottled silty clay loam

41 to 54 inches; yellowish brown, mottled clay

Substratum:

54 to 74 inches; yellowish brown, light brownish gray, and strong brown clay

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate above the fragipan and slow in the fragipan. Available water capacity is moderate. Surface runoff is medium. The seasonal high water table is at a depth of 18 to 30 inches. Tilth is good. The soil can be worked throughout a wide range in moisture content. The root zone is only moderately deep because of the fragipan. Limestone or shale bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Beasley, Crider, Faywood, Lawrence, Lowell, and Sandview soils. These soils are in landscape positions similar to those of the Nicholson soil. They make up about 5 to 15 percent of this map unit.

Most areas of the Nicholson soil are used for cultivated crops, hay, or pasture. Some areas are used for residential or urban development. A few areas are wooded.

This soil is suited to most of the cultivated crops commonly grown in the county. The seasonal high water table and the fragipan are limitations. Planting and harvesting are sometimes delayed by the wetness. The root zone is restricted by the fragipan. The crops that have moderately deep rooting systems and can withstand slight wetness grow best. The hazard of erosion is moderate if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter,

and control erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is suited to hay and pasture, but the fragipan restricts the rooting depth and limits forage production during dry periods. The plants that have moderately deep rooting systems and can withstand slight wetness grow best. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black oak, hickory, northern red oak, sweetgum, white oak, and yellow-poplar are the most common trees. The trees preferred for planting include eastern white pine, northern red oak, sweetgum, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main concerns in managing woodland are the hazard of erosion and plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The wetness, the content of clay, and the slow permeability in the fragipan are limitations on sites for most sanitary facilities. The wetness is a limitation affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIe.

NhC—Nicholson silt loam, 6 to 12 percent slopes.

This very deep, moderately well drained, sloping soil is on broad ridgetops and the upper side slopes in the western, central, and southern parts of the county. Areas are about 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 9 inches; brown silt loam

Subsoil:

9 to 28 inches; yellowish brown silt loam and silty clay loam

28 to 41 inches; a fragipan of yellowish brown, mottled silty clay loam

41 to 54 inches; yellowish brown, mottled clay

Substratum:

54 to 74 inches; yellowish brown, light brownish gray, and strong brown clay

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate above the fragipan and slow in the fragipan. Available water capacity is moderate. Surface runoff is medium. The seasonal high water table is at a depth of 18 to 30 inches. Tilth is good. The soil can be worked throughout a wide range in moisture content. The root zone is only moderately deep because of the fragipan. Limestone or shale bedrock is at a depth of more than 60 inches.

Included with this soil in mapping are small areas of Beasley, Crider, Faywood, Lowell, and Sandview soils. These soils are in landscape positions similar to the Nicholson soil. They make up about 5 to 15 percent of this map unit.

Most areas of the Nicholson soil are used for hay, pasture, or cultivated crops. A few areas are wooded.

This soil is suited to most of the cultivated crops commonly grown in the county. The slope is the main limitation. The hazard of erosion is severe if conventional tillage is used. The root zone is restricted by the fragipan. The crops that have moderately deep rooting systems and can withstand slight wetness grow best. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is suited to hay and pasture, but the fragipan restricts the rooting depth and limits forage production during dry periods. The plants that have moderately deep rooting systems and can withstand slight wetness grow best. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black oak, hickory, northern red oak, sweetgum, white oak, and yellow-poplar are the most common trees. The trees preferred for planting include eastern white pine, northern red oak, sweetgum, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concerns are the hazard of erosion and plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The wetness,

the content of clay, the slow permeability in the fragipan, and the slope are limitations on sites for most sanitary facilities. The wetness and the slope are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIIe.

No—Nolin silt loam, occasionally flooded. This very deep, well drained, nearly level soil is on flood plains throughout the county. Slopes range from 0 to 2 percent. Areas are about 5 to more than 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; brown silt loam

Subsoil:

8 to 27 inches; dark yellowish brown silt loam

27 to 53 inches; brown silt loam

Substratum:

53 to 65 inches; brown very gravelly silt loam

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate, and available water capacity is high. The root zone is very deep. Surface runoff is slow. The seasonal high water table is at a depth of 36 to 72 inches. Tilth is good. The soil can be worked throughout a wide range in moisture content. It is occasionally flooded in winter and early spring (fig. 12).

Included with this soil in mapping are small areas of Boonesboro, Newark, Skidmore, and Woolper soils. These soils are in landscape positions similar to those of the Nolin soil. Also included are a few small areas of Elk soils on low stream terraces and small areas of soils that are similar to the Nolin soil but are moderately deep over bedrock. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Nolin soil are used for cultivated crops, hay, or pasture. A few areas in narrow valleys are wooded.

This soil is suited to most of the cultivated crops commonly grown in the county. Corn is the most common crop. Flooding is most likely to occur in winter and early spring, before the crops are planted. The soil can be cropped intensively without significant soil loss. Applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth and maintain the content of

organic matter. A permanent plant cover reduces the hazard of erosion on streambanks. Diversions can help to control the deposition of overwash from the adjacent upland side slopes.

This soil is well suited to hay and pasture, although some hay crops may be damaged by flooding in winter and early spring. The species selected for planting should be those that provide high-quality forage and an adequate ground cover and can withstand flooding. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. American sycamore, black walnut, eastern cottonwood, sweetgum, and yellow-poplar are the most common trees. The trees preferred for planting include black walnut, eastern cottonwood, eastern white pine, sweetgum, white ash, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concerns are seedling mortality and plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is poorly suited to urban uses because of the hazard of flooding.

The capability subclass is IIw.

OtB—Otwell silt loam, 2 to 6 percent slopes. This very deep, moderately well drained or well drained, gently sloping soil is on terraces along the larger streams throughout the county. Areas are about 5 to 15 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 10 inches; brown silt loam

Subsoil:

10 to 30 inches; dark yellowish brown and yellowish brown silt loam that has mottles in the lower part
30 to 56 inches; a fragipan of yellowish brown, mottled silt loam and silty clay loam

Substratum:

56 to 77 inches; strong brown, light brownish gray, and light gray silty clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow above the fragipan and very slow in the fragipan. Available water capacity is moderate. Surface runoff is medium. The seasonal high water table is at a depth of 24 to 42 inches. Tilth is good. The soil can be worked



Figure 12.—Flooding on Nolin silt loam, occasionally flooded.

throughout a wide range in moisture content. The root zone is only moderately deep because of the fragipan. The shrink-swell potential is moderate below the fragipan.

Included with this soil in mapping are small areas of Allegheny and Elk soils. These soils are in landscape positions similar to those of the Otwell soil. Also included are small areas of Newark and Nolin soils in depressions and along drainageways, some low areas of Otwell soils that are subject to flooding in late winter or early spring, and some small areas of soils that are similar to the Otwell soil but have a surface layer of

loam. Included soils make up about 10 to 15 percent of this map unit.

Most areas of the Otwell soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is suited to most of the cultivated crops commonly grown in the county. The seasonal high water table and the fragipan are limitations. Planting and harvesting are sometimes delayed by the wetness. The root zone is restricted by the fragipan. The crops that have moderately deep rooting systems and can withstand slight wetness grow best. The hazard of erosion is moderate if conventional tillage is used.

Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and control erosion. A permanent plant cover reduces the hazard of erosion in drainageways. In some areas diversions can help to control runoff and the deposition of overwash from the adjacent upland side slopes.

This soil is suited to hay and pasture, but the fragipan restricts the rooting depth and limits forage production during dry periods. The plants that have moderately deep rooting systems and can withstand slight wetness grow best. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black gum, black oak, sugar maple, white oak, and yellow-poplar are the most common trees. The trees preferred for planting include eastern white pine, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The wetness, the content of clay, and the very slow permeability in the fragipan are limitations on sites for most sanitary facilities. The wetness and the moderate shrink-swell potential are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Flooding is a hazard in the low included areas. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIe.

OtC—Otwell silt loam, 6 to 12 percent slopes. This very deep, moderately well drained and well drained, sloping soil is on terraces along the larger streams throughout the county. Areas are about 5 to 15 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 10 inches; brown silt loam

Subsoil:

10 to 30 inches; dark yellowish brown and yellowish

brown silt loam that has mottles in the lower part 30 to 56 inches; a fragipan of yellowish brown, mottled silt loam and silty clay loam

Substratum:

56 to 77 inches; strong brown, light brownish gray, and light gray silty clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately slow above the fragipan and very slow in the fragipan. Available water capacity is moderate. Surface runoff is medium. The seasonal high water table is at a depth of 24 to 42 inches. Tilth is good. The soil can be worked throughout a wide range in moisture content. The root zone is only moderately deep because of the fragipan. The shrink-swell potential is moderate below the fragipan.

Included with this soil in mapping are small areas of Allegheny and Elk soils. These soils are in landscape positions similar to those of the Otwell soil. Also included are small areas of Newark and Nolin soils in depressions and along drainageways and some small areas of soils that are similar to the Otwell soil but have a surface layer of loam. Included soils make up about 10 to 15 percent of this map unit.

Most areas of the Otwell soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is suited to most of the cultivated crops commonly grown in the county. The slope is the main limitation. The hazard of erosion is severe if conventional tillage is used. The root zone is restricted by the fragipan. The crops that have moderately deep rooting systems and can withstand slight wetness grow best. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways. In some areas diversions can help to control runoff and the deposition of overwash from the adjacent upland side slopes.

This soil is suited to hay and pasture, but the fragipan restricts the rooting depth and limits forage production during dry periods. The plants that have moderately deep rooting systems and can withstand wetness grow best. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures,

weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black gum, black oak, sugar maple, white oak, and yellow-poplar are the most common trees. The trees preferred for planting include eastern white pine, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The slope, the wetness, the content of clay, and the very slow permeability in the fragipan are limitations on sites for most sanitary facilities. The slope, the wetness, and the moderate shrink-swell potential are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Flooding is a very severe hazard in the low included areas. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIIe.

Pt—Pits, quarries. This map unit occurs as open limestone quarries, excavated areas, and landfills from which soil material and rocks have been removed (fig. 13). The bottom of the quarries or excavated areas is 25 to more than 50 feet below the original surface. The exposed bedrock now supports few or no plants. Several of the older, smaller limestone quarries have filled with water and are used as a source of livestock water. The largest area is a limestone quarry south of Flemingsburg, along Kentucky Highway 11 at Fleming Creek. This area is used as a landfill. Several older, smaller quarries are nearby. The only other large area is a waste disposal area in the eastern part of the county.

The capability subclass is VIIIs.

SaB—Sandview silt loam, 2 to 6 percent slopes.

This very deep, well drained, gently sloping soil is on the broad, convex tops of ridges in the northern and western parts of the county. Areas are about 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; dark yellowish brown silt loam

Subsoil:

8 to 42 inches; dark yellowish brown and strong brown silt loam and silty clay loam

42 to 49 inches; strong brown silty clay

49 to 76 inches; strong brown clay

Substratum:

76 to 98 inches; yellowish brown clay

This soil is high in natural fertility and moderate in organic matter content. Permeability is moderate in the upper part of the soil and moderately slow in the lower part. Available water capacity is high. The root zone is very deep. Surface runoff is medium. Tilth is good. The soil can be worked throughout a wide range in moisture content. The shrink-swell potential is moderate in the lower part of the subsoil.

Included with this soil in mapping are small areas of Crider, Lowell, and Nicholson soils. These soils are in landscape positions similar to those of the Sandview soil. Also included are some small areas of soils that are similar to the Sandview soil but have a yellowish red, clayey subsoil. Included soils make up about 10 to 15 percent of this map unit.

Most areas of the Sandview soil are used for cultivated crops, hay, or pasture. A few small areas are wooded.

This soil is well suited to the cultivated crops commonly grown in the county. It is used extensively for corn, tobacco, small grain, or soybeans. The hazard of erosion is moderate if conventional tillage is used. Farming on the contour, strip cropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain tilth, maintain the content of organic matter, and control erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is well suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. American elm, black cherry, black locust, black walnut, bur oak, hackberry, hickory, northern red oak, white ash, and white oak are the most common trees. The trees preferred for planting include black walnut, eastern white pine, northern red oak, shortleaf pine, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition.

Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to most urban uses. The content of clay, seepage, and the moderately slow permeability in



Figure 13 —A limestone quarry in an area of Pits, quarries.

the lower part of the subsoil are limitations on sites for some sanitary facilities. The content of clay and the moderate shrink-swell potential are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is 1Ie.

ShC—Shelocta gravelly silt loam, 4 to 12 percent slopes. This deep and very deep, well drained, gently sloping and sloping soil is on side slopes, foot slopes, and fans along intermittent streams in the eastern part of the county. Areas are about 5 to 15 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 3 inches; dark brown gravelly silt loam

Subsurface layer:

3 to 7 inches; yellowish brown gravelly silt loam

Subsoil:

7 to 35 inches; yellowish brown channery and very channery silt loam

35 to 60 inches; yellowish brown, mottled very channery silty clay loam

This soil is medium in natural fertility and moderate in

organic matter content. Permeability is moderate, and available water capacity is high. The root zone is deep or very deep. Surface runoff is medium. Tilth is good. The soil can be worked throughout a wide range in moisture content.

Included with this soil in mapping are small areas of Brownsville and Muse soils. These soils are in landscape positions similar to those of the Shelocta soil. Also included are some small areas of soils that are similar to the Shelocta soil but have a higher content of coarse fragments. Included soils make up about 10 to 15 percent of this map unit.

Most areas of the Shelocta soil are used for cultivated crops, hay, or pasture. Some areas are used as woodland.

This soil is suited to the cultivated crops commonly grown in the county. The slope is the main limitation. The hazard of erosion is moderate or severe if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways. In some areas diversions can help to control the deposition of overwash from the adjacent side slopes.

This soil is well suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. American beech, black oak, cucumbertree, hickory, red maple, shortleaf pine, white oak, and yellow-poplar are the most common trees. The trees preferred for planting include black walnut, eastern white pine, northern red oak, shortleaf pine, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The slope, seepage, and small stones are limitations on sites for most sanitary facilities. The slope is the main limitation affecting most kinds of building site development. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIIe.

ShD—Shelocta gravelly silt loam, 12 to 20 percent slopes. This deep and very deep, well drained, moderately steep soil is on side slopes and foot slopes in the eastern part of the county. Areas are about 5 to 15 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 3 inches; dark brown gravelly silt loam

Subsurface layer:

3 to 7 inches; yellowish brown gravelly silt loam

Subsoil:

7 to 35 inches; yellowish brown channery and very channery silt loam

35 to 60 inches; yellowish brown, mottled very channery silty clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and available water capacity is high. The root zone is deep or very deep. Surface runoff is rapid. Tilth is good. The soil can be worked throughout a wide range in moisture content.

Included with this soil in mapping are small areas of Brownsville and Muse soils. These soils are in landscape positions similar to those of the Shelocta soil. Also included are some small areas of soils that are similar to the Shelocta soil but have fewer coarse fragments or a higher content of sand in the subsoil and some areas of Shelocta soils that have slopes of 20 to 30 percent and few or common sandstone boulders on the surface. Included soils make up about 10 to 15 percent of this map unit.

Most areas of the Shelocta soil are used as woodland. Some areas are used for hay and pasture. A few small areas are used for cultivated crops.

This soil is suited to occasional cultivation, but it is better suited to pasture and hay. The slope is the main limitation. The hazard of erosion is very severe if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates

and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. American beech, black oak, red maple, scarlet oak, white oak, and yellow-poplar are the most common trees. The trees preferred for planting include eastern white pine, shortleaf pine, and white oak. Table 7 provides specific information relating to potential productivity and the trees suitable for planting on warm and cool aspects.

The main concerns in managing woodland are an equipment limitation, the hazard of erosion, seedling mortality, and plant competition. Steep skid trails and logging roads are subject to rilling and gulying unless they are protected by adequate water bars or a plant cover, or both. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is poorly suited to urban uses. The slope, seepage, and small stones are limitations on sites for most sanitary facilities. The slope is the main limitation affecting most kinds of building site development. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IVe.

ShF—Shelocta gravelly silt loam, 20 to 40 percent slopes. This deep and very deep, well drained, steep and very steep soil is on side slopes, benches, and foot slopes in the eastern part of the county. Areas are about 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 3 inches; dark brown gravelly silt loam

Subsurface layer:

3 to 7 inches; yellowish brown gravelly silt loam

Subsoil:

7 to 35 inches; yellowish brown channery and very channery silt loam

35 to 60 inches; yellowish brown, mottled very channery silty clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and available water capacity is high. The root zone is deep or very deep. Surface runoff is rapid.

Included with this soil in mapping are small areas of Berks, Brownsville, Muse, and Wharton soils. These soils are in landscape positions similar to those of the Shelocta soil. Also included are some small areas of Skidmore soils on narrow flood plains, some small areas of soils that are similar to the Shelocta soil but

have fewer coarse fragments or a higher content of sand in the subsoil, and some areas of Shelocta soils that have slopes of more than 40 percent and few or common sandstone boulders on the surface. Included soils make up about 10 to 15 percent of this map unit.

Most areas of the Shelocta soil are used as woodland. This soil is generally unsuited to cultivated crops, hay, and pasture. The slope is the main limitation. The hazard of erosion is very severe.

This soil is suited to woodland. American beech, black oak, red maple, scarlet oak, white oak, and yellow-poplar are the most common trees. The trees preferred for planting include eastern white pine, shortleaf pine, and white oak. Table 7 provides specific information relating to potential productivity and the trees suitable for planting on warm and cool aspects.

The main concerns in managing woodland are an equipment limitation, the hazard of erosion, seedling mortality, and plant competition. Skid trails and logging roads are subject to rilling and gulying unless they are protected by adequate water bars or a plant cover, or both. The slope restricts the use of some wheeled equipment. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is poorly suited to urban uses. The slope is the main limitation. Overcoming this limitation is difficult.

The capability subclass is VIIe.

SrF—Shelocta-Wharton complex, 20 to 55 percent slopes. These deep and very deep, well drained and moderately well drained, steep and very steep soils are at the head of drainageways and below the highest ridges in the eastern part of the county. The Shelocta soil has slopes of 20 to 55 percent. It is in colluvial areas. The Wharton soil has slopes of 20 to 35 percent. It is on head slopes and in the adjacent intermittent drainageways. Areas are about 20 to more than 150 acres in size. The two soils occur as areas so closely intermingled that they could not be mapped separately at the scale selected for mapping.

The Shelocta soil makes up about 40 percent of this unit, and the Wharton soil makes up about 35 percent. Included soils make up the rest.

The typical sequence, depth, and composition of the layers of the Shelocta soil are as follows—

Surface layer:

0 to 3 inches; dark brown gravelly silt loam

Subsurface layer:

3 to 7 inches; yellowish brown gravelly silt loam

Subsoil:

7 to 35 inches; yellowish brown channery and very channery silt loam

35 to 60 inches; yellowish brown, mottled very channery silty clay loam

The Shelocta soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate, and available water capacity is high. The root zone is deep or very deep. Surface runoff is rapid.

The typical sequence, depth, and composition of the layers of the Wharton soil are as follows—

Surface layer:

0 to 5 inches; yellowish brown silt loam

Subsoil:

5 to 19 inches; yellowish brown silt loam and silty clay loam

19 to 41 inches; light olive gray, light yellowish brown, and strong brown silty clay loam and channery silt loam

Bedrock:

41 to 46 inches; weathered shale

The Wharton soil is medium in natural fertility and moderate in organic matter content. Permeability is slow or moderately slow, and available water capacity is high. The seasonal high water table is at a depth of 18 to 36 inches. The root zone is deep or very deep. Surface runoff is rapid. The shrink-swell potential is moderate. The depth to bedrock is more than 40 inches.

Included with these soils in mapping are small areas of Berks, Brownsville, and Blairton soils. These included soils are in landscape positions similar to those of the Shelocta and Wharton soils. Also included are some small areas of Skidmore soils are on narrow flood plains, some small areas of soils that are similar to the Shelocta soil but have fewer coarse fragments or a higher content of sand in the subsoil, and a few small areas of soils that have slopes of 2 to 12 percent and have the characteristics of a fragipan. Included soils make up about 25 percent of this map unit.

The Shelocta and Wharton soils are used as woodland. They are generally unsuited to cultivated crops, hay, and pasture. The slope and a very severe hazard of erosion are the main management concerns.

These soils are suited to woodland. Black oak, hickory, white oak, and yellow-poplar are the most common trees. The understory is mainly flowering dogwood, hickory, ironwood, red maple, sassafras, and sourwood. The trees preferred for planting include eastern white pine, shortleaf pine, and white oak. Table 7 provides specific information relating to potential productivity and the trees suitable for planting on warm and cool aspects.

The main concerns in managing woodland are an equipment limitation, the hazard of erosion, seedling

mortality, and plant competition. Skid trails and logging roads are subject to rilling and gulying unless they are protected by adequate water bars or a plant cover, or both. The slope restricts the use of some wheeled equipment. Reforestation can be severely limited because of competition from undesirable understory plants.

These soils are poorly suited to urban uses. The slope is the main limitation. Overcoming this limitation is difficult. Accessibility is limited.

The capability subclass is VIIe.

SsB—Shrouts silty clay loam, 2 to 6 percent slopes. This moderately deep, well drained, gently sloping soil is on the convex tops of ridges in the east-central part of the county. Areas are about 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches; very dark grayish brown silty clay loam

Subsoil:

6 to 29 inches; light olive brown, olive, and greenish gray silty clay and clay

Substratum:

29 to 37 inches; yellowish brown, olive, and greenish gray channery clay

Bedrock:

37 to 42 inches; soft, layered, calcareous shale

This soil is medium in natural fertility and moderate or high in organic matter content. Permeability is slow, and available water capacity is moderate. The root zone is moderately deep. Surface runoff is medium. Tilth is only fair because the surface layer is silty clay loam. The shrink-swell potential is moderate. The depth to soft, calcareous shale bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Beasley soils. These soils are in landscape positions similar to those of the Shrouts soil. Also included are small areas of soils that are similar to the Shrouts soil but are redder in the subsoil or are moderately well drained or somewhat poorly drained. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Shrouts soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is suited to the cultivated crops commonly grown in the county. The hazard of erosion is moderate if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage,

growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and control erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is suited to hay and pasture. Because of the content of clay in the surface layer, however, the pasture can be damaged if it is grazed during wet periods. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is suited to woodland. Black oak, eastern redcedar, scarlet oak, Virginia pine, and white oak are the most common trees. The trees preferred for planting include Virginia pine and white oak. Table 7 provides specific information relating to potential productivity. The main concerns in managing woodland are plant competition, seedling mortality, and an equipment limitation. Windthrow of some species of pine is a hazard. Reforestation can be moderately limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The content of clay, the depth to bedrock, and the slow permeability are limitations on sites for most sanitary facilities. The depth to bedrock, the content of clay, and the moderate shrink-swell potential are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIe.

StC3—Shrouts silty clay, 6 to 12 percent slopes, severely eroded. This moderately deep, well drained, sloping soil is on convex ridgetops and side slopes in the central and eastern parts of the county. Erosion has removed most of the original surface layer and, in places, some of the subsoil. Some areas have rills and shallow gullies. Areas are about 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 4 inches; very dark grayish brown silty clay

Subsoil:

4 to 27 inches; light olive brown, olive, and greenish gray silty clay and clay

Substratum:

27 to 35 inches; yellowish brown, olive, and greenish gray channery clay

Bedrock:

35 to 40 inches; soft, layered, calcareous shale

This soil is low in natural fertility and moderate or high in organic matter content. Permeability is slow, and available water capacity is moderate. The root zone is moderately deep. Surface runoff is rapid. Tilth is poor because the surface layer consists mostly of clayey subsoil material. The shrink-swell potential is moderate. The depth to soft, calcareous shale bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Beasley soils. These soils are in landscape positions similar to those of the Shrouts soil. Also included are small areas of a soil that is similar to the Shrouts soil but is redder in the subsoil and some small areas of soils that are loamy in the subsoil. Included soils make up about 10 to 15 percent of this map unit.

Most areas of the Shrouts soil are used for pasture or woodland. A few small areas are used for cultivated crops or hay.

This soil is poorly suited to cultivated crops. The slope is the main limitation. The hazard of erosion is very severe if conventional tillage is used. Farming on the contour, strip cropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is suited to hay and pasture. Because of the content of clay in the surface layer, however, the pasture can be damaged if it is grazed during wet periods. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is suited to woodland. Black oak, eastern redcedar, scarlet oak, Virginia pine, and white oak are the most common trees. Virginia pine is preferred for planting. Table 7 provides specific information relating to potential productivity. The main concerns in managing woodland are the hazard of erosion, seedling mortality, and an equipment limitation. Windthrow of some species of pine is a hazard.

This soil is suited to some urban uses. The content of clay, the slope, the slow permeability, and the depth

to bedrock are limitations on sites for most sanitary facilities. The slope, the content of clay, and the moderate shrink-swell potential are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IVe.

StD3—Shrouts silty clay, 12 to 20 percent slopes, severely eroded. This moderately deep, well drained, moderately steep soil is on side slopes and foot slopes below the Knobs area in the eastern part of the county. Erosion has removed most of the original surface layer and, in places, some of the subsoil. Some areas have rills and shallow gullies. Areas are about 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 4 inches; very dark grayish brown silty clay

Subsoil:

4 to 27 inches; light olive brown, olive, and greenish gray silty clay and clay

Substratum:

27 to 35 inches; yellowish brown, olive, and greenish gray channery clay

Bedrock:

35 to 40 inches; soft, layered, calcareous shale

This soil is low in natural fertility and moderate or high in organic matter content. Permeability is slow, and available water capacity is moderate. The root zone is moderately deep. Surface runoff is rapid. The shrink-swell potential is moderate. The depth to soft, calcareous shale bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Beasley and Muse soils. These soils are in landscape positions similar to those of the Shrouts soil. Also included are small areas of a soil that is similar to the Shrouts soil but is redder in the subsoil and is deeper over bedrock and some small areas of soils that are loamy in the subsoil. Included soils make up about 10 to 15 percent of this map unit.

Most areas of the Shrouts soil are used as woodland. A few small areas are used for cultivated crops, pasture, or hay.

This soil is poorly suited to cultivated crops. The slope and a very severe hazard of erosion are the main management concerns.

This soil is suited to hay and pasture. Because of the content of clay in the surface layer, however, the

pasture can be damaged if it is grazed during wet periods. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is suited to woodland. Black oak, eastern redcedar, scarlet oak, Virginia pine, and white oak are the most common trees. Virginia pine is preferred for planting. Table 7 provides specific information relating to potential productivity. The main management concerns are the hazard of erosion, seedling mortality, and an equipment limitation. Windthrow of some species of pine is a hazard.

This soil is poorly suited to most urban uses. The content of clay, the slope, the slow permeability, and the depth to bedrock are limitations on sites for most sanitary facilities. The slope is the main limitation affecting most kinds of building site development. Low strength and the slope are limitations on sites for local roads and streets. Overcoming these limitations is difficult and expensive.

The capability subclass is VIe.

Sx—Skidmore gravelly silt loam, occasionally flooded. This deep and very deep, well drained, nearly level soil is on flood plains and low alluvial fans in narrow and moderately wide valleys in the eastern part of the county. Slopes range from 0 to 2 percent. Areas are about 10 to more than 200 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; brown gravelly silt loam

Subsoil:

8 to 19 inches; yellowish brown gravelly loam

19 to 38 inches; brown and yellowish brown extremely gravelly loam

Substratum:

38 to 60 inches; yellowish brown extremely gravelly clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderately rapid, and available water capacity is low. The seasonal high water table is at a depth of 36 to 48 inches. The root zone is deep or very deep. Surface runoff is slow. Tillage is only fair because of the content of gravel in the surface layer. The soil is occasionally flooded in winter and early spring.

Included with this soil in mapping are small areas of

Newark, Nolin, and Shelocta soils. These soils are in landscape positions similar to those of the Skidmore soil. Also included are a few small areas of Morehead soils on low stream terraces and small areas of somewhat poorly drained soils that are less gravelly and more acid than the Skidmore soil. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Skidmore soil are used for cultivated crops, hay, or pasture. A few areas in narrow valleys are wooded.

This soil is suited to most of the cultivated crops commonly grown in the county. Corn is the most common crop. Tobacco is seldom grown unless a berm or diversion has been installed to prevent flooding from streams and the deposition of overwash from the surrounding side slopes. Small grain crops are sometimes damaged by flooding. The soil can be cropped intensively without significant soil loss. Applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth and the organic matter content. A permanent plant cover reduces the hazard of erosion on streambanks. Diversions can help to control the deposition of overwash from the adjacent upland side slopes.

This soil is well suited to hay and pasture, although some hay crops may be damaged by flooding. The species selected for planting should be those that provide high-quality forage and an adequate ground cover and can withstand brief periods of flooding. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. American sycamore, black gum, black oak, river birch, sweetgum, white oak, and yellow-poplar are the most common trees. The trees preferred for planting include American sycamore, eastern white pine, sweetgum, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concerns are seedling mortality and plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is poorly suited to most urban uses. The hazard of flooding, the wetness, seepage, the depth to bedrock, and small stones in the surface layer are management concerns. Overcoming these limitations is difficult and expensive.

The capability subclass is IIw.

TsB—Tilsit silt loam, 2 to 6 percent slopes. This deep and very deep, moderately well drained, gently sloping soil is on the broad tops of ridges in the eastern part of the county. Areas are about 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; brown silt loam

Subsoil:

8 to 18 inches; light olive brown silt loam

18 to 25 inches; light yellowish brown, mottled silt loam

25 to 60 inches; a fragipan of yellowish brown, light brownish gray, and pale brown, mottled silty clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate above the fragipan and slow in the fragipan. Available water capacity is moderate. Surface runoff is medium. The seasonal high water table is at a depth of 18 to 30 inches. Tilth is good. The soil can be worked throughout a wide range in moisture content. The root zone is only moderately deep because of the fragipan. Siltstone, sandstone, or shale bedrock is at a depth of more than 40 inches.

Included with this soil in mapping are small areas of Blairton soils. These soils are in landscape positions similar to those of the Tilsit soil. Also included are areas of soils that are similar to the Tilsit soil but are somewhat poorly drained. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Tilsit soil are used for cultivated crops, hay, or pasture. A few areas are wooded.

This soil is suited to most of the cultivated crops commonly grown in the county. The seasonal high water table and the fragipan are limitations. Planting and harvesting are sometimes delayed by the wetness. The root zone is restricted by the fragipan. The crops that have moderately deep rooting systems and can withstand slight wetness grow best. The hazard of erosion is moderate if conventional tillage is used. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and control erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is suited to hay and pasture, but the fragipan restricts the rooting depth and limits forage production during dry periods. The plants that have moderately deep rooting systems and can withstand

slight wetness grow best. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black oak, hickory, red maple, scarlet oak, shortleaf pine, southern red oak, Virginia pine, white oak, and yellow-poplar are the most common trees. The trees preferred for planting include eastern white pine, shortleaf pine, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The wetness, the content of clay, the depth to bedrock, and the slow permeability in the subsoil are limitations on sites for most sanitary facilities. The wetness is a limitation affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIe.

TsC—Tilsit silt loam, 6 to 12 percent slopes. This deep and very deep, moderately well drained, sloping soil is on the broad tops of ridges in the eastern part of the county. Areas are about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; brown silt loam

Subsoil:

8 to 18 inches; light olive brown silt loam

18 to 25 inches; light yellowish brown, mottled silt loam

25 to 60 inches; a fragipan of yellowish brown, light brownish gray, and pale brown, mottled silty clay loam

This soil is medium in natural fertility and moderate in organic matter content. Permeability is moderate above the fragipan and slow in the fragipan. Available water capacity is moderate. Surface runoff is medium. The seasonal high water table is at a depth of 18 to 30 inches. Tilth is good. The soil can be worked throughout a wide range in moisture content. The root zone is only moderately deep because of the fragipan. Siltstone, sandstone, or shale bedrock is at a depth of more than 40 inches.

Included with this soil in mapping are small areas of Blairton soils. These soils are in landscape positions similar to those of the Tilsit soil. Also included are areas of soils that are similar to the Tilsit soil but are somewhat poorly drained. Included soils make up about 5 to 10 percent of this map unit.

Most areas of the Tilsit soil are used for hay, pasture, or cultivated crops. A few areas are wooded.

This soil is suited to most of the cultivated crops commonly grown in the county. The slope is the main limitation. The hazard of erosion is severe if conventional tillage is used. The root zone is restricted by the fragipan. The crops that have moderately deep rooting systems and can withstand slight wetness grow best. Farming on the contour, strip cropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and help to control runoff and erosion. A permanent plant cover reduces the hazard of erosion in drainageways.

This soil is suited to hay and pasture, but the fragipan restricts the rooting depth and limits forage production during dry periods. The plants that have moderately deep rooting systems and can withstand slight wetness grow best. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black oak, hickory, red maple, scarlet oak, shortleaf pine, southern red oak, Virginia pine, white oak, and yellow-poplar are the most common trees. The trees preferred for planting include eastern white pine, shortleaf pine, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concern is plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The wetness, the content of clay, the slope, the depth to bedrock, and the slow permeability in the subsoil are limitations on sites for most sanitary facilities. The wetness and the slope are limitations affecting most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome some of these limitations.

The capability subclass is IIIe.

WoB—Woolper silt loam, 2 to 6 percent slopes, rarely flooded. This very deep, well drained, gently sloping soil is on the lower foot slopes and low terraces along the larger streams in the western and central parts of the county. Areas are about 5 to 70 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 15 inches; dark brown silt loam

Subsurface layer:

15 to 23 inches; dark yellowish brown silt loam

Subsoil:

23 to 28 inches; strong brown silty clay loam

28 to 34 inches; dark yellowish brown silty clay

34 to 48 inches; dark yellowish brown, mottled clay

Substratum:

48 to 60 inches; dark yellowish brown clay

This soil is medium in natural fertility and high in organic matter content. Permeability is moderately slow or slow, and available water capacity is high. The root zone is very deep. Surface runoff is medium. Tilth is good. The soil can be worked throughout a wide range in moisture content. It is subject to rare flooding. The shrink-swell potential is moderate.

Included with this soil in mapping are small areas of Boonesboro, Elk, and Nolin soils. These soils are in landscape positions similar to those of the Woolper soil. Also included are small areas of soils that are similar to the Woolper soil but have a thicker dark surface layer and small areas of soils that are moderately well drained. Included soils make up about 10 percent of this map unit.

Most areas of the Woolper soil are used for cultivated crops, hay, or pasture. A few small areas are wooded.

This soil is well suited to the cultivated crops commonly grown in the county. The hazard of erosion is

moderate if conventional tillage is used. Some small grain crops may be damaged by flooding. Farming on the contour, stripcropping, applying a system of conservation tillage, growing cover crops, returning crop residue to the soil, and including grasses and legumes in the cropping sequence help to maintain or improve tilth, maintain the content of organic matter, and control erosion. A permanent plant cover reduces the hazard of erosion in drainageways. In some areas diversions can help to control runoff and the deposition of overwash from the adjacent upland side slopes.

This soil is well suited to hay and pasture. The species selected for planting should be those that provide high-quality forage and an adequate ground cover. Pasture renovation should be frequent enough to maintain the desired species. Management concerns include proper stocking rates, rotation grazing, proper seeding rates and mixtures, weed control, and a well planned mowing and harvesting schedule.

This soil is well suited to woodland. Black oak, black walnut, chinkapin oak, hickory, sugar maple, white ash, white oak, and yellow buckeye are the most common trees. The trees preferred for planting include eastern white pine, northern red oak, white ash, white oak, and yellow-poplar. Table 7 provides specific information relating to potential productivity. The main management concerns are an equipment limitation, seedling mortality, and plant competition. Reforestation can be severely limited because of competition from undesirable understory plants.

This soil is suited to some urban uses. The content of clay, the flooding, and the moderately slow or slow permeability are management concerns on sites for most sanitary facilities. The content of clay and the flooding limit most kinds of building site development. Low strength is a limitation on sites for local roads and streets. Good design and proper installation procedures can minimize or overcome these limitations.

The capability subclass is IIe.

Prime Farmland

In this section, prime farmland is defined and the soils in Fleming County that are considered prime farmland are listed.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, state, and federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. The moisture supply must be adequate, and the growing season must be sufficiently long. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They either are used for food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in national forests, national parks, military reservations, and state parks.

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is

acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent.

About 50,744 acres in Fleming County, or nearly 23 percent of the total acreage, is prime farmland or potentially is prime farmland. This land is in scattered areas throughout the county. The largest areas are in general soil map units 2, 4, 5, and 7. The main crops grown on the prime farmland are tobacco, corn, and hay and some wheat and soybeans.

A recent trend in some parts of the county has been the conversion of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are wet, more erodible, and less productive than prime farmland and cannot be easily cultivated.

The following map units are considered prime farmland in Fleming County. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 4. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

Some soils that have a high water table and all soils that are frequently flooded during the growing season qualify as prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. If applicable, the need for these measures is indicated in parentheses after the map unit name in the following list. Onsite evaluation is necessary to determine if the limitations have been overcome by corrective measures.

The soils identified as prime farmland in Fleming County are:

AgB	Allegheny fine sandy loam, 2 to 6 percent slopes
BaB	Beasley silt loam, 2 to 6 percent slopes
BrB	Blairton silt loam, 2 to 6 percent slopes

Bs	Boonesboro silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)	Mo	Morehead silt loam, rarely flooded
CrB	Crider silt loam, 2 to 6 percent slopes	MsB2	Muse channery silt loam, 2 to 6 percent slopes, eroded
EkB	Elk silt loam, 2 to 6 percent slopes	Ne	Newark silt loam, occasionally flooded (where drained)
FwB	Faywood silt loam, 2 to 6 percent slopes	NhB	Nicholson silt loam, 2 to 6 percent slopes
La	Lawrence silt loam (where drained)	No	Nolin silt loam, occasionally flooded
LoB	Lowell silt loam, 2 to 6 percent slopes	OtB	Otwell silt loam, 2 to 6 percent slopes
Ma	McGary silt loam (where drained)	SaB	Sandview silt loam, 2 to 6 percent slopes
Me	Melvin silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)	SsB	Shrouts silty clay loam, 2 to 6 percent slopes
		TsB	Tilsit silt loam, 2 to 6 percent slopes
MgB	Monongahela loam, 2 to 6 percent slopes	WoB	Woolper silt loam, 2 to 6 percent slopes, rarely flooded

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature (23).

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of

land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

In 1987, about 49,240 acres in Fleming County was used for crops. Of this acreage, 7,000 acres was used for alfalfa, 29,000 acres for other hay crops, and 13,240 acres for cultivated crops, mainly corn, tobacco, and soybeans. About 100,000 acres was used as pasture (17).

The soils in the county have high potential for increased production of food. The county has more than 50,000 acres of prime farmland. About half of this acreage is used for crops, and the rest is used as pasture or woodland (31). In addition to the reserve capacity represented by this land, application of the latest crop production technology to all of the cropland in the county can increase food production. This soil survey can facilitate the application of this technology.

The main management needs on the cropland and pasture in the county are measures that control erosion, reduce wetness, and maintain or improve fertility and tilth.

Erosion is the primary management concern on most of the cropland and pasture in Fleming County. It is a hazard if the slope is more than 2 percent. Except for some nearly level areas on flood plains and stream terraces, nearly all the cropland and pasture in the county is gently sloping to very steep.

Erosion of the surface layer is damaging because it reduces the productivity of the soils and can result in the sedimentation of streams, ponds, and lakes. Productivity is reduced as organic matter and plant nutrients are lost and part of the subsoil is incorporated into the plow layer. Erosion is especially damaging on soils that have a clayey subsoil, such as Beasley and Lowell soils. It further limits the depth of the root zone

in soils that already have a limiting layer in or below the subsoil or are shallow or moderately deep over bedrock. Examples are Monongahela, Nicholson, and Otwell soils, which have a fragipan, and Blairton, Eden, and Faywood soils, which are moderately deep over bedrock. The pollution caused by erosion reduces the quality of water for municipal and recreational uses and for livestock, fish, and wildlife.

Erosion-control measures generally provide a protective cover, control runoff, and increase the rate of water infiltration. A conservation tillage system that keeps vegetation on the soil for extended periods helps to control erosion and maintain productivity. On livestock farms a cropping system that includes grasses and legumes helps to control erosion on sloping land and provides nitrogen and improves tilth for subsequent crops.

Erosion is controlled in Fleming County mainly through cultural practices, such as conservation tillage, a cropping sequence that includes grasses and legumes, cover crops, and rotation grazing, rather than through structural measures, such as terraces and diversions. Information about the design and application of erosion-control measures for each kind of soil in the county is available at the local office of the Soil Conservation Service.

Soil drainage is a major management need on about 10 percent of the acreage used for crops and pasture in Fleming County. Unless drained, somewhat poorly drained or poorly drained soils are so wet that the production of crops is restricted. The somewhat poorly drained or poorly drained soils in the county are the Lawrence, McGary, Melvin, Morehead, and Newark soils. About 21,000 acres in the county is made up of these soils or the moderately well drained Blairton, Monongahela, Nicholson, and Otwell soils. In some areas of the somewhat poorly drained or poorly drained soils, open ditches, tile drainage, or both have been used to remove excess water. In areas of the moderately well drained soils, a drainage system generally is not needed, but the crops that can withstand slight wetness should be selected for planting.

Soil fertility is medium or high in nearly all of the soils in Fleming County, except for Colyer soils and the severely eroded Shrouts soils. Crops respond well to applications of lime and fertilizer. Many soils throughout the county are very strongly acid in their natural state. If lime has never been applied, ground limestone is required to raise the pH level sufficiently for the optimum yield of alfalfa and other crops that grow best on nearly neutral soils. Available phosphorus and potash levels are naturally low in most of these soils. On all soils, applications of lime and fertilizer should be

based on the results of soil tests, on the needs of the crop, and on the expected level of yields. The Cooperative Extension Service can help to determine the kinds and amounts of fertilizer and lime to be applied.

Tilth is an important factor affecting the germination of seeds and the infiltration of water into the soil. Most of the uneroded soils in Fleming County have a surface layer of silt loam that is moderate in organic matter content and can be easily worked. Some of the eroded soils in sloping areas have lost most of their original surface layer and cannot be easily tilled because of the increased content of clay in the present surface layer. Applying a system of conservation tillage, managing crop residue, seeding cover crops, and adding manure or other organic material to the soil help to control erosion and improve soil structure, permeability, and tilth.

The field crops suited to the soils and climate in Fleming County include many that are not commonly grown. Corn, tobacco, and soybeans are the most common row crops. Grain sorghum is occasionally grown along with corn for silage. Other crops, including sweet peppers, potatoes, popcorn, sunflowers, and peanuts, can be grown on a large scale if economic conditions are favorable. Wheat and barley are the most common close-growing crops. Wheat, barley, oats, and rye are generally grown as winter cover, but in a few areas they are grown as cash crops. Grass seed can be produced from fescue, red clover, orchardgrass, brome grass, and timothy.

The specialty crops grown in the county include vegetables, such as sweet corn and tomatoes; tree fruits, such as apples; nursery plants; and Christmas trees. Other specialty crops, such as strawberries, blueberries, grapes, and additional kinds of vegetables, can be grown in the county.

Very deep or deep, well drained soils that warm up early in the spring are especially well suited to many vegetables and small fruits. Examples are the Allegheny, Crider, Elk, Lowell, Sandview, and Woolper soils that have slopes of less than 6 percent. These soils make up about 17,280 acres in the county. Generally, crops can be planted and harvested earlier on these soils than on other soils in the county. Most of the well drained soils are suitable for orchards and nursery plants. Soils in low areas where frost is frequent and air drainage is poor generally are poorly suited to early vegetables, small fruits, and orchards.

The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide the latest information about growing specialty crops.

In 1987, there were about 37,000 cattle and calves in Fleming County (17). Most of the hayland and pasture

in the county supports a mixture of grasses and legumes. Much of the hay is grown in a hay and pasture rotation system. During harvesting, most of the hay is rolled into large, circular bales.

About 68 percent of the total farm cash receipts in Fleming County is derived from the sale of livestock or livestock products. A high-quality forage program is necessary. A successful livestock program depends on a large supply of homegrown feed of adequate quality. A good forage program can furnish as much as 78 percent of the feed required for beef cattle and 66 percent of that required for dairy cattle (15).

The suitability of the soils in Fleming County for hay and pasture varies widely because of differences in the depth to bedrock or other limiting layers, internal drainage, the ability to supply moisture, and many other properties. The production of grasses and legumes or grass-legume mixtures varies on the different soils. As a result, selection of suitable plants or plant mixtures is important.

The nearly level to gently sloping soils that are deep and well drained should be used for the most productive crops, such as corn silage, alfalfa, and a mixture of alfalfa and orchardgrass or of alfalfa and timothy. On the steeper soils sod-forming grasses, such as tall fescue and bluegrass, are needed to minimize erosion. Alfalfa should be grown with cool-season grasses where the soils are at least 2 feet deep over bedrock and are well drained. The soils that are less than 2 feet deep over bedrock and the more poorly drained soils can be used for grasses or for mixtures of clover and grasses. Legumes can be established through renovation of areas where the sod is dominated by grasses.

The forage species selected for planting should be those that are suited not only to the soil but also to the intended use. Proper plant selection can provide maximum quality and versatility in the forage program. Legumes generally produce higher quality feed than grasses. Grasses, such as orchardgrass, timothy, and tall fescue, generally should be grown for hay and silage.

Tall fescue is an important cool-season grass that is suited to a wide range of soil conditions. It is grown for both hay and pasture. As it grows during the period August to November, the fescue commonly is permitted to accumulate in the field. It is grazed late in fall and in winter. Applications of nitrogen fertilizer help to achieve the maximum production when the fescue is accumulating in the field.

Warm-season grasses, which are planted from early in April to late in May, alleviate the summer slump in areas of a cool-season grass, such as tall fescue and Kentucky bluegrass. They grow well during warm

periods, especially from mid-June to September, when the cool-season grasses taper off. Examples of the warm-season grasses are switchgrass, big bluestem, indiagrass, and Caucasian bluestem.

Renovation is one of the ways to increase yields in areas of hay and pasture. When an area is renovated, the sod is partially destroyed, lime and fertilizer are applied, and desirable forage plants are seeded. Seeding legumes, which take in nitrogen from the air, provides high-quality feed and increases summer production.

Additional information about managing pasture and hayland is available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management (27). The criteria used in grouping the soils do not include major, and generally expensive, landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly

because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w*, *s*, or *c*.

The acreage of soils in each capability class and subclass is shown in table 6. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Charles A. Foster, forester, Soil Conservation Service, helped prepare this section.

About 72,900 acres in Fleming County, or nearly 33 percent of the land area, is commercial forest land (19). The county is part of the Western Mesophytic Forest region. The characteristic trees in this region are American beech, American sycamore, black locust, black oak, black walnut, chestnut oak, chinkapin oak, hickory, northern red oak, pin oak, red maple, sugar maple, white ash, white oak, and yellow-poplar. The dominant forest types are oak-hickory, which makes up about 45 percent of the forest land; central mixed hardwoods, 24 percent; elm-ash, 14 percent; redcedar-hardwoods, 11 percent; and southern pine, white ash, and maple-beech, 6 percent.

The wooded tracts in the county are generally private holdings of about 24 acres. Most of the forest land can produce 50 cubic feet or more of wood per acre per year, but actual production is about 33 cubic feet. The private forest land is essentially unmanaged because of several obstacles. About 30 percent of the landowners have woodland that happens to be part of a farm or tract. Many stands are not well stocked with high-quality trees. Many tracts are owned for less than 10 years. The woodland can be improved by removing low-quality trees from fully stocked and understocked stands of all sizes and by regenerating sawtimber stands after harvest.

The wood industry in Fleming County consists mainly of commercial sawmills and pallet mills. It produces rough lumber, pallets, crossties, dimension stock, wood chips, and fuel wood. Several mills in adjacent counties buy logs or standing trees from landowners in Fleming County.

Soils vary in their ability to produce trees. Available water capacity and depth of the root zone have major effects on tree growth. Fertility and texture also influence tree growth. Elevation, aspect, and climate

determine the kinds of trees that can grow on a site. Elevation and aspect are of particular importance in mountainous areas.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. Table 7 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight*, *moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of moderate or severe indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, or the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, or susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment is needed. On the steepest slopes, even tracked equipment cannot be operated and more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if wetness restricts equipment use for more than 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. Ratings

of moderate or severe indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of moderate or severe indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing a surface drainage system, and providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is moderate or severe.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. Plant competition is more severe on the more productive soils, on poorly drained soils, and on soils having a restricted root zone that holds moisture. The risk is *slight* if competition from undesirable plants hinders adequate natural or artificial reforestation but does not necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from undesirable plants hinders natural or artificial reforestation to the extent that intensive site preparation and maintenance are needed. The risk is *severe* if competition from undesirable plants prevents adequate natural or artificial reforestation unless the site is intensively prepared and maintained. A moderate or severe rating indicates the need for site preparation to ensure the development of an adequately stocked stand. Managers must plan site preparation measures to ensure reforestation without delays.

The *potential productivity of common trees* on a soil is expressed as a *site index* and a *volume* number. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate. The first tree listed for each soil is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

The *site index* is determined by taking height

measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands (3, 5, 6, 7, 8, 9, 10, 12, 14, 20, 21, 22, 24, 30).

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year calculated at the age of culmination of mean annual increment.

Trees to plant are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for use in reforestation.

Recreation

In table 8, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes, stones, or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Gregory K. Johnson, resource specialist, Soil Conservation Service, helped prepare this section.

The principal kinds of wildlife in Fleming County are cottontail rabbits, gray squirrels, fox squirrels, raccoons, opossums, skunks, red foxes, gray foxes, white-tailed deer, turkey, coyote, bobwhite quail, grouse, and mourning doves. The county also includes many species of nongame birds and mammals. It has about 34 species of mammals, 110 species of birds, and 33 species of reptiles and amphibians. Although the types of habitat required by wildlife vary, deer and squirrels

generally use woodland habitat; rabbits, quail, and doves use openland habitat; and ducks and geese use wetland habitat.

Photographers, birdwatchers, and others are interested in the flora and fauna of Fleming County. The streams in the county are inhabited by a variety of fish, including warm-water game fish, pan fish, and rough fish. Examples are largemouth bass and bluegill.

Successful management of wildlife habitat requires a suitable combination of food, cover, and water. Lack of any one of these necessities, an imbalance between them, or an inadequate distribution of them can severely limit or eliminate the population of desirable wildlife species.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife (40). This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops

are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, bluegrass, orchardgrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are chicory, goldenrod, beggarweed, aster, and ragweed.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, and blackberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian olive, autumn olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are Virginia pine, white pine, and redcedar.

Wetland plants are annual and perennial, wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, cattail, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to

bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements (fig. 14), small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and



Figure 14.—Buildings in an area of Morehead silt loam, rarely flooded. Nolin silt loam, occasionally flooded, is in the foreground.

observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance

of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. Depth to a high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, depth to a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength

(as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent,

surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, depth to a water table, slope, and flooding affect both

types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good*, *fair*, or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The

performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also

evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel or stones, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel or stones, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant nutrients as it decomposes.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low

seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones, boulders, or organic matter. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; and susceptibility to flooding. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large

stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available

water capacity, restricted rooting depth, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas (16, 28). Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52

percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the Unified soil classification system (2) and the system adopted by the American Association of State Highway and Transportation Officials (1).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SC-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest.

Rock fragments 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence the shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $\frac{1}{3}$ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is

saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior (25).

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil

to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission. Examples are Allegheny, Crider, Elk, and Nolin soils.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or

soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission. Examples are Beasley, Eden, Lowell, and Muse soils.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission. Examples are Cynthiana, Fairmount, Melvin, and Shrouts soils.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams or by runoff from adjacent slopes. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none*, *rare*, *occasional*, or *frequent*. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons characteristic of soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent*; and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severely corrosive environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed

as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Physical and Chemical Analyses of Selected Soils

The results of physical analysis of several typical pedons in the survey area are given in table 17 and the results of chemical analysis in table 18. The data are for soils sampled at carefully selected sites. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." Soil samples were analyzed by the Kentucky Agricultural Experiment Station, Lexington, Kentucky.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an oven-dry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods (32).

Coarse materials—(2-75 mm fraction) weight estimates of the percentages of all materials less than 75 mm (3B1).

Sand—(0.05-2.0 mm fraction) weight percentages of materials less than 2 mm (3A1).

Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all materials less than 2 mm (3A1).

Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of materials less than 2 mm (3A1).

Organic carbon—dichromate, ferric sulfate titration (6A1a).

Extractable cations—ammonium acetate pH 7.0, uncorrected; calcium (6N2), magnesium (6O2), sodium (6P2), potassium (6Q2).

Extractable acidity—barium chloride-triethanolamine I (6H1a).

Cation-exchange capacity—ammonium acetate, pH 7.0 (5A1a).

Cation-exchange capacity—sum of cations (5A3a).

Base saturation—ammonium acetate, pH 7.0 (5C1).

Base saturation—sum of cations, TEA, pH 8.2 (5C3).

Reaction (pH)—1:1 water dilution (8C1a).

Reaction (pH)—potassium chloride (8C1c).

Available phosphorus—procedure (656) Kentucky Agricultural Experiment Station.

Calcium carbonate equivalent—procedure (23b) USDA Handbook 60, USDA Salinity Laboratory 1954 (6N7).

Data sheet symbols—(2B).

Extractable bases—(5B1a).

Field sampling—site selection (1A1).

Field sampling—soil sampling (1A2).

Laboratory preparation—standard (air dry) material (1B1).

Particles—more than 2 mm by field or laboratory weighing (3B1a).

Particles—less than 2 mm (2A1).

Particles—(specified size) 2 mm (2A2).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (29). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Alfisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udalf (*Ud*, meaning udic moisture regime, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludalfs.

FAMILY. Families are established within a subgroup

on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine, mixed, mesic Typic Hapludalfs.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer of the substratum within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (26). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (29). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Allegheny Series

The Allegheny series consists of very deep, well drained soils that are moderately permeable. These soils formed in old alluvial material eroded from areas

of sandstone, siltstone, and shale on uplands. They are on two distinct landforms in the southern part of the county. They are on stream terraces and in areas of older terrace deposits on uplands along the Licking River. Slopes range from 2 to 20 percent. The soils are fine-loamy, mixed, mesic Typic Hapludults.

Allegheny soils are associated on the landscape with Elk, Lawrence, Monongahela, and Otwell soils on stream terraces and with Beasley and Eden soils on uplands. Elk, Lawrence, and Otwell soils are in a fine-silty family. Lawrence soils are somewhat poorly drained and have a fragipan. Otwell and Monongahela soils are moderately well drained and have a fragipan. Beasley and Eden soils are in a fine textured family. Eden soils are moderately deep over bedrock.

Typical pedon of Allegheny fine sandy loam, 2 to 6 percent slopes; about 3 miles southwest of Sunset, 0.8 mile south of Kentucky Highway 1336, about 900 yards east of the Licking River, 75 feet northeast of a fence, and 50 feet north of a farm road, in a pasture; soil map sheet 25; about 2,149,720 feet east and 281,880 feet north by the Kentucky coordinate grid system:

Ap—0 to 8 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; many fine and very fine roots; moderately alkaline; clear smooth boundary.

Bt1—8 to 15 inches; yellowish brown (10YR 5/6) silt loam; weak fine and medium subangular blocky structure; friable; common fine roots; few faint clay films on faces of peds; few fine rounded quartz pebbles; moderately alkaline; gradual smooth boundary.

Bt2—15 to 21 inches; yellowish brown (10YR 5/6) loam; few fine distinct light yellowish brown (2.5Y 6/4) mottles; moderate medium subangular blocky structure; firm; common fine roots; common faint clay films on faces of peds; few fine black concretions; about 1 percent rounded quartz pebbles; extremely acid; clear smooth boundary.

Bt3—21 to 25 inches; yellowish brown (10YR 5/6) loam; common fine distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; common fine roots; common faint clay films on faces of peds; common pockets of light gray uncoated sand grains; few fine black concretions; about 1 percent rounded quartz pebbles; extremely acid; clear smooth boundary.

Bt4—25 to 33 inches; yellowish brown (10YR 5/6) loam; common fine and medium prominent yellowish red (5Y 4/6) and common fine distinct light brownish gray (2.5Y 6/4) mottles; moderate medium subangular blocky structure; firm; common fine roots; common distinct brown (7.5YR 4/4) clay films

on faces of peds; few pockets of light gray uncoated sand grains; few very fine black concretions; extremely acid; gradual wavy boundary.

Bt5—33 to 48 inches; strong brown (7.5YR 5/6) loam; common fine prominent light brownish gray (2.5Y 6/4) and common medium prominent red (2.5YR 4/8) mottles and few fine and medium faint pinkish gray (7.5YR 6/2) streaks; weak medium subangular blocky structure; few fine roots; common faint clay films on faces of peds; extremely acid; gradual smooth boundary.

BC—48 to 53 inches; yellowish brown (10YR 5/4) clay loam; common fine distinct strong brown (7.5YR 5/8) and many fine and medium faint light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; firm; extremely acid; gradual smooth boundary.

C—53 to 77 inches; yellowish red (5YR 5/8) and yellowish brown (10YR 5/6) clay loam; common fine and medium distinct light yellowish brown (2.5Y 6/4) and few fine faint light brownish gray mottles; massive; few faint clay flows; firm; extremely acid.

The thickness of the solum is 40 to 60 inches, and the depth to bedrock is more than 60 inches. Unless the soils have been limed, reaction ranges from extremely acid to strongly acid throughout the profile. The content of rounded quartz pebbles and chert fragments ranges from 0 to 15 percent in the Ap and Bt horizons and from 0 to 25 percent in the BC and C horizons.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. Most pedons are mottled in shades of brown, red, or yellow. Below the upper 24 inches of the argillic horizon, they are mottled in shades of gray. The texture is clay loam, sandy clay loam, loam, or silt loam.

The BC and C horizons have hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8. Most pedons are mottled in shades of brown, yellow, or gray. The fine-earth fraction is fine sandy loam, loam, sandy clay loam, or clay loam.

Beasley Series

The Beasley series consists of deep or very deep, well drained soils that are moderately slowly permeable. These soils formed in material weathered from soft, calcareous shale, siltstone, limestone, and brown, coarse grained dolomite. They are on ridgetops and side slopes in the central part of the county. Slopes range from 2 to 30 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Beasley soils are associated on the landscape with

Allegheny, Crider, Lawrence, McGary, Nicholson, and Shrouts soils. Allegheny soils are in a fine-loamy family. Crider soils are in a fine-silty family, have a solum that is 60 or more inches thick, and are 60 or more inches deep over hard bedrock. Lawrence and Nicholson soils are in a fine-silty family and have a fragipan. Also, Lawrence soils are somewhat poorly drained, and Nicholson soils are moderately well drained. McGary soils are somewhat poorly drained. Shrouts soils are less than 40 inches deep over soft bedrock.

Typical pedon of Beasley silt loam, 2 to 6 percent slopes; about 0.5 mile northwest of Mt. Carmel, 0.3 mile north of a cemetery, 60 feet west of Turkey Run Road, in a hay field; soil map sheet 2; about 2,174,120 feet east and 361,269 feet north by the Kentucky coordinate grid system:

- Ap—0 to 10 inches; brown (10YR 4/3) silt loam; weak fine subangular blocky structure parting to weak fine granular; friable; common fine roots; few fine black concretions; few chert fragments; slightly acid; clear smooth boundary.
- Bt1—10 to 17 inches; yellowish brown (10YR 5/8) silty clay; moderate fine and medium subangular blocky structure; firm; few fine roots; common faint clay films on faces of peds; few fine black concretions; strongly acid; clear wavy boundary.
- Bt2—17 to 25 inches; yellowish brown (10YR 5/8) clay; strong medium subangular blocky structure; very firm; few fine roots; many faint and distinct clay films on faces of peds; common fine black concretions; strongly acid; clear smooth boundary.
- BC—25 to 32 inches; yellowish brown (10YR 5/8) clay; common medium distinct strong brown (7.5YR 5/8) mottles; few fine faint pale brown stains; weak coarse subangular blocky structure; very firm; few fine roots; few faint clay films on faces of peds; medium acid; clear smooth boundary.
- C1—32 to 46 inches; yellowish brown (10YR 5/8) clay; many fine and medium distinct light yellowish brown (2.5Y 6/4) mottles; massive; very firm; few fine roots; many fine and medium black concretions; medium acid; clear wavy boundary.
- C2—46 to 60 inches; light olive gray (5Y 6/2), strong brown (7.5YR 5/8), and reddish yellow (7.5YR 6/6) clay; massive; about 10 percent alternating layers of weathered siltstone and calcareous shale; very few fine roots; many fine black concretions; neutral; gradual wavy boundary.
- Cr—60 to 72 inches; layered, soft, calcareous, olive and light greenish gray shale.

The thickness of the solum is 20 to 40 inches, and the depth to calcareous shale or dolomite bedrock is more than 40 inches. Reaction ranges from very

strongly acid to neutral in the upper part of the solum, from medium acid to moderately alkaline in the lower part of the solum, and from neutral to moderately alkaline in the C horizon. The content of chert, limestone, and siltstone fragments ranges from 0 to 10 percent in the solum and from 0 to 20 percent in the C horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The texture is silt loam or silty clay loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 8. Most pedons are mottled in shades of red, brown, or yellow. Some have grayish mottles in the lower part of this horizon. The texture is silty clay or clay.

The BC horizon has hue of 10YR, 7.5YR, or 2.5Y, value of 4 or 5, and chroma of 3 to 8. The texture is silty clay or clay.

The C horizon has matrix colors and mottles in shades of gray, olive, brown, or red. The fine-earth fraction is silty clay or clay.

Berks Series

The Berks series consists of moderately deep, well drained soils that are moderately permeable or moderately rapidly permeable. These soils formed in material weathered from sandstone, siltstone, and shale. They are on side slopes and ridgetops in the eastern part of the county. Slopes range from 20 to 60 percent.

Berks soils are loamy-skeletal, mixed, mesic Typic Dystrochrepts. In most areas of this county, they differ from the typical Berks soils because they have a thin 2CB horizon of silty clay and are underlain by hard, fine grained sandstone bedrock instead of weathered bedrock. Also, the content of rock fragments in the 2CB horizon is lower than is defined as the range for the series. These differences do not significantly affect the use and management of the soils because the slope is an overriding limitation.

Berks soils are associated on the landscape with Brownsville, Colyer, Muse, Shelocta, Trappist, and Wharton soils. Shelocta and Wharton soils are in a fine-loamy family and are deep or very deep over bedrock. Wharton soils are moderately well drained. Brownsville and Muse soils are deep or very deep over bedrock. Colyer soils are in a clayey-skeletal family and are shallow over bedrock. Muse and Trappist soils are in a clayey family.

Typical pedon of Berks very channery silt loam, in an area of Brownsville-Berks complex, very rocky, 20 to 55 percent slopes, eroded; about 1 mile northeast of Ryan, 0.5 mile east of the confluence of Black Stairs Branch

and Fox Creek, 30 feet south of Black Stairs Branch, in an area of woodland; the inset to soil map sheet 19; about 2,224,680 feet east and 320,200 feet north by the Kentucky coordinate grid system:

- A—0 to 4 inches; brown (10YR 4/3) very channery silt loam; weak fine granular structure; very friable; many fine to coarse roots; 40 to 45 percent sandstone gravel and channers and 15 percent stones; very strongly acid; gradual wavy boundary.
- Bw1—4 to 13 inches; light yellowish brown (10YR 6/4) channery silt loam; weak medium subangular blocky structure; friable; common fine to coarse roots; few faint silt coatings on faces of peds; about 30 percent gravel and channers and 15 percent stones; very strongly acid; clear smooth boundary.
- Bw2—13 to 19 inches; yellowish brown (10YR 5/4) very channery silt loam; weak medium and coarse subangular blocky structure; friable; common fine and medium roots; few faint silt coatings on faces of peds; about 40 percent channers and gravel and 25 percent stones; very strongly acid; clear smooth boundary.
- Bw3—19 to 27 inches; yellowish brown (10YR 5/4) very channery silt loam; moderate medium subangular blocky structure; firm; few fine and medium roots; few faint silt coatings on faces of peds; about 45 percent channers and gravel and 25 percent stones; very strongly acid; clear smooth boundary.
- 2CB—27 to 33 inches; yellowish brown (10YR 5/4) silty clay; common fine faint light brownish gray (10YR 6/2) and common fine distinct strong brown (7.5YR 5/6) mottles; moderate medium and coarse subangular blocky structure; firm; few fine roots; very strongly acid; abrupt smooth boundary.
- 3R—33 inches; hard, fine grained sandstone bedrock.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. Reaction ranges from extremely acid to slightly acid in the solum and the 2CB horizon. The content of fine grained sandstone, siltstone, and shale fragments ranges from 10 to 70 percent in the A horizon, from 25 to 80 percent in individual subhorizons of the Bw horizon, and from 0 to 80 percent in the 2CB horizon. By weighted average, the content of rock fragments in the Bw horizon ranges from 35 to 75 percent.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3.

The Bw horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 to 6. The fine-earth fraction is silt loam or loam.

The 2CB horizon has hue of 10YR and value and chroma of 4 to 6. The fine-earth fraction is silt loam, loam, silty clay loam, or silty clay.

Blairton Series

The Blairton series consists of moderately deep, moderately well drained soils that are moderately slowly permeable. These soils formed in material weathered from interbedded silt, shale, siltstone, and fine grained sandstone. They are on ridgetops and the upper side slopes in the eastern part of the county. Slopes range from 2 to 30 percent. The soils are fine-loamy, mixed, mesic, Aquic Hapludults.

Blairton soils are associated on the landscape with Tilsit soils. Tilsit soils are in a fine-silty family, are deep or very deep over bedrock, and have a fragipan.

Typical pedon of Blairton silt loam, 12 to 30 percent slopes, eroded; about 4 miles east of Wallingford, 0.6 mile south of the Lewis County line, 0.4 mile east of Hester Ridge Road, 100 feet east of an old log barn, in a hay field; soil map sheet 13; about 2,207,760 feet east and 328,720 feet north by the Kentucky coordinate grid system:

- Ap—0 to 6 inches; dominantly dark yellowish brown (10YR 4/4) silt loam; brown (10YR 4/3) in the upper 1.5 inches; moderate and weak fine granular structure; friable; many fine and coarse roots; about 1 percent ironstone channers; neutral; clear smooth boundary.
- Bt1—6 to 14 inches; yellowish brown (10YR 5/6) silt loam; common fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; common fine roots; common faint clay films on faces of peds; about 5 percent siltstone channers; very strongly acid; gradual wavy boundary.
- Bt2—14 to 18 inches; strong brown (7.5YR 5/8) silty clay loam; many fine and medium prominent red (2.5YR 4/8) and light brownish gray (2.5Y 6/2) mottles; moderate medium and coarse subangular blocky structure; firm; few fine roots; common prominent light yellowish brown (2.5Y 6/4) clay films on faces of peds; about 10 percent siltstone and shale fragments; very strongly acid; gradual wavy boundary.
- BC—18 to 27 inches; light brownish gray (2.5Y 6/2) channery silt loam; common medium distinct light greenish gray (5GY 7/1) mottles; moderate medium and coarse angular blocky and weak thick platy structure; firm; common distinct light yellowish brown (2.5Y 6/4) clay coatings on faces of peds; about 15 percent yellowish red (5YR 5/6) shale fragments; very strongly acid; gradual wavy boundary.
- Cr—27 to 35 inches; yellowish brown, soft shale.

The thickness of the solum and the depth to

interbedded soft shale and siltstone bedrock or to fine grained sandstone bedrock range from 20 to 40 inches. Reaction is extremely acid or very strongly acid in the solum unless the soils have been limed. The content of sandstone, siltstone, ironstone, and shale fragments ranges from 0 to 5 percent in the Ap horizon, from 0 to 15 percent in the Bt horizon, and from 10 to 60 percent in the BC horizon.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. Some pedons have an E horizon, which has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 to 6.

The Bt horizon has hue of 7.5YR to 10YR, value of 5 or 6, and chroma of 4 to 6. Most pedons are mottled in shades of red, brown, olive, or gray. This horizon is silt loam, silty clay loam, or the channery or very channery analogs of those textures.

The BC horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 8. The fine-earth fraction is mainly silt loam or silty clay loam, but in some pedons it is silty clay.

Some pedons have a C horizon. This horizon has colors similar to those of the BC horizon. The fine-earth fraction is silt loam, silty clay loam, or silty clay.

Boonesboro Series

The Boonesboro series consists of moderately deep, well drained soils that have a moderately permeable A horizon and a rapidly permeable B horizon. These soils formed in alluvial material over limestone bedrock. They are on low flood plains in narrow valleys throughout the western and central parts of the county. Slopes range from 0 to 3 percent. The soils are fine-loamy, mixed, mesic Fluventic Hapludolls.

Boonesboro soils are associated on the landscape with Newark, Nolin, and Woolper soils. Newark and Nolin soils are in a fine-silty family, are very deep over bedrock, and do not have a mollic epipedon. Also, Newark soils are somewhat poorly drained. Woolper soils are on low stream terraces and toe slopes. They are in a fine textured family and are very deep over bedrock.

Typical pedon of Boonesboro silt loam, frequently flooded; about 0.5 mile northeast of the railroad crossing at Nepton, 380 yards east of Kentucky Highway 367, about 40 feet east of Johnson Creek, in a tobacco field; soil map sheet 4; about 2,116,520 feet east and 343,120 feet north by the Kentucky coordinate grid system:

Ap—0 to 10 inches; dark brown (10YR 3/3) silt loam; weak fine granular structure; very friable; common fine roots; about 1 percent limestone fragments; neutral; clear wavy boundary.

AB—10 to 20 inches; brown (10YR 4/3) silt loam; weak fine and medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; few faint silt coatings on faces of peds; mildly alkaline; gradual smooth boundary.

Bw1—20 to 26 inches; brown (10YR 4/3) gravelly silt loam; weak medium subangular blocky structure; friable; common fine roots; few fine black concretions; about 15 percent siltstone and limestone fragments; mildly alkaline; clear smooth boundary.

Bw2—26 to 33 inches; brown (10YR 4/3) very gravelly silt loam; common fine distinct light yellowish brown (2.5Y 6/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; common fine and medium black concretions; about 50 percent siltstone and limestone fragments; mildly alkaline; abrupt smooth boundary.

R—33 inches; hard limestone bedrock.

The thickness of the solum and the depth to limestone bedrock range from 20 to 40 inches. The combined thickness of the Ap and AB horizons ranges from 12 to 24 inches. Reaction ranges from slightly acid to moderately alkaline throughout the solum. The content of limestone, siltstone, and chert fragments ranges from 0 to 20 percent in the Ap and AB horizons and from 15 to 70 percent in the Bw horizon.

The Ap horizon has hue of 10YR or 7.5Y, value of 3, and chroma of 2 or 3. The AB horizon has hue of 10YR or 7.5Y, value of 3 or 4, and chroma of 2 or 3.

The Bw horizon has hue of 10YR or 7.5YR, value of 4, and chroma of 2 to 4. The fine-earth fraction is silt loam, silty clay loam, or clay loam.

Brownsville Series

The Brownsville series consists of deep or very deep, well drained soils that are moderately permeable or moderately rapidly permeable. These soils formed in colluvium and in material weathered from sandstone and siltstone. They are on side slopes in the eastern part of the county. Slopes range from 20 to 60 percent. The soils are loamy-skeletal, mixed, mesic Typic Dystrochrepts.

Brownsville soils are associated on the landscape with Berks, Colyer, Muse, Shelocta, Trappist, and Wharton soils. Berks soils are intermingled with areas of the Brownsville soils. They are moderately deep. Colyer soils are in a clayey-skeletal family and are shallow over bedrock. Muse and Trappist soils are in a clayey family. Also, Trappist soils are moderately deep. Shelocta and Wharton soils are in a fine-loamy family. Also, Wharton soils are moderately well drained.

Typical pedon of Brownsville channery silt loam, in

an area of Brownsville-Berks complex, very rocky, 20 to 55 percent slopes, eroded; about 1 mile northeast of Ryan, 0.5 mile east of the confluence of Black Stairs Branch and Fox Creek, 70 feet south of Black Stairs Branch, in an area of woodland; the inset to soil map sheet 19; about 2,224,690 feet east and 320,160 feet north by the Kentucky coordinate grid system:

- A—0 to 4 inches; brown (10YR 4/3) channery silt loam; weak fine granular structure; very friable; common fine and medium roots; about 16 percent siltstone channers; very strongly acid; abrupt smooth boundary.
- Bw1—4 to 8 inches; brown (10YR 5/3) channery silt loam; weak fine and medium subangular blocky structure; friable; few medium roots; about 20 percent siltstone channers; very strongly acid; gradual wavy boundary.
- Bw2—8 to 19 inches; yellowish brown (10YR 5/4) very channery silt loam; weak medium subangular blocky structure; friable; few medium roots; about 40 percent siltstone channers and stones; very strongly acid; gradual wavy boundary.
- Bw3—19 to 41 inches; yellowish brown (10YR 5/4) extremely channery silt loam; weak medium subangular blocky structure; friable; few fine roots; about 60 percent siltstone channers and stones; very strongly acid; gradual wavy boundary.
- Bw4—41 to 54 inches; yellowish brown (10YR 5/4) extremely flaggy clay loam; weak medium subangular blocky structure; friable; few fine roots; about 70 percent siltstone flagstones and channers; very strongly acid; gradual wavy boundary.
- R—54 inches; hard, fine grained sandstone bedrock.

The thickness of the solum is 24 to 55 inches, and the depth to bedrock is 40 to 72 inches. Reaction ranges from extremely acid to slightly acid in the A horizon and from extremely acid to strongly acid in the Bw horizon. The content of siltstone and fine grained sandstone fragments ranges from 10 to 35 percent in the A horizon and from 15 to 70 percent in the Bw horizon. By weighted average, the content of rock fragments in the Bw horizon is about 55 percent.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4.

The Bw horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. The fine-earth fraction is silt loam, loam, or clay loam in the lower part of this horizon.

Some pedons have a C horizon. This horizon has hue of 10YR or 2.5Y and value and chroma of 4 to 6. The fine-earth fraction is mainly silt loam or loam, but in some pedons it is clay loam. Reaction ranges from extremely acid to medium acid. The content of siltstone

or fine grained sandstone fragments ranges from 25 to 85 percent.

Colyer Series

The Colyer series consists of shallow, well drained soils that are slowly permeable. These soils formed in material weathered from black fissile shale. They are on side slopes and nose slopes in the eastern part of the county. Slopes range from 12 to 55 percent. The soils are clayey-skeletal, mixed, mesic Lithic Dystrochrepts.

Colyer soils are associated on the landscape with Berks, Brownsville, Muse, Shelocta, and Trappist soils. Berks and Brownsville soils are in a loamy-skeletal family. Berks and Trappist soils are moderately deep over bedrock. Brownsville, Muse, and Shelocta soils are deep or very deep over bedrock. Muse and Trappist soils are in a clayey family. Shelocta soils are in a fine-loamy family.

Typical pedon of Colyer channery silty clay loam, in an area of Colyer-Trappist complex, 12 to 55 percent slopes, eroded; about 1.3 miles southeast of Beechburg, 430 yards south of a lake in the Kentucky Wildlife Area, 200 yards southwest of a barn, 100 feet west of a gravel road, in an area of woodland; soil map sheet 12; about 2,177,080 feet east and 338,800 feet north by the Kentucky coordinate grid system:

- A—0 to 2 inches; dark yellowish brown (10YR 4/4) channery silty clay loam; weak fine granular structure; very friable; many fine roots; about 15 percent fragments of weathered black fissile shale; extremely acid; clear smooth boundary.
- Bw1—2 to 5 inches; yellowish brown (10YR 5/4) very channery silty clay; few fine distinct strong brown (7.5YR 5/8) mottles; few distinct light brownish gray (2.5Y 6/2) coatings on shale fragments; moderate medium subangular blocky structure; firm; common medium and few fine roots; few faint clay coatings on faces of peds; about 35 percent fragments of weathered black fissile shale; extremely acid; clear smooth boundary.
- Bw2—5 to 10 inches; yellowish brown (10YR 5/4) very channery clay; moderate fine and medium subangular blocky structure; firm; common fine and coarse roots; about 55 percent fragments of weathered black fissile shale; common faint clay coatings on the fragments; extremely acid; clear smooth boundary.
- C1—10 to 13 inches; yellowish brown (10YR 5/6) extremely channery clay; common fine prominent yellowish red (5YR 5/8) and few fine prominent light olive gray (5Y 6/2) mottles; massive; firm; common fine and coarse roots; about 78 percent fragments of weathered black fissile shale; common faint clay

coatings on the fragments; extremely acid; clear smooth boundary.

- C2—13 to 17 inches; yellowish brown (10YR 5/4) extremely channery clay; common fine prominent yellowish red (5YR 5/8) and common fine prominent light olive gray (5Y 6/2) mottles; massive; very firm; few fine roots; about 80 percent fragments of weathered black fissile shale interbedded with clay; extremely acid; abrupt smooth boundary.
- R—17 inches; hard, layered, gray (5YR 5/1) fissile shale.

The thickness of the solum and the depth to bedrock range from 8 to 19 inches. Reaction ranges from extremely acid to medium acid in the A horizon and is extremely acid or very strongly acid in the B and C horizons. The content of black fissile shale fragments ranges from 5 to 35 percent in the A horizon, from 35 to 55 percent in the Bw horizon, and from 35 to 90 percent in the C horizon.

The A horizon has hue of 10YR or 7.5YR, value of 2 to 5, and chroma of 3 or 4.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. Most pedons are mottled in shades of red, brown, or yellow. The texture is very channery or extremely channery silty clay or clay.

The C horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 4 to 6. Most pedons are mottled in shades of red, brown, gray, or yellow. The texture is very channery or extremely channery silty clay or clay.

Crider Series

The Crider series consists of very deep, well drained soils that are moderately permeable. These soils formed in a mantle of silty material and in the underlying material weathered from limestone. They are on broad ridgetops and side slopes in the northern and central parts of the county. Slopes range from 2 to 12 percent. The soils are fine-silty, mixed, mesic Typic Paleudalfs.

Crider soils are associated on the landscape with Beasley, Nicholson, and Shrouts soils. Beasley and Shrouts soils are in a fine textured family. Beasley soils have a solum that is less than 40 inches thick. Shrouts soils are moderately deep over bedrock. Nicholson soils are moderately well drained and have a fragipan.

Typical pedon of Crider silt loam, 2 to 6 percent slopes; about 2.3 miles north of Hillsboro, 470 yards west of Kentucky Highway 111, about 240 feet southeast of a gravel farm road, in a pasture; soil map sheet 21; about 2,166,360 feet east and 301,280 feet north by the Kentucky coordinate grid system:

- Ap—0 to 8 inches; dark yellowish brown (10YR 4/4) silt

loam; weak fine granular structure; very friable; many fine roots; slightly acid; clear smooth boundary.

- Bt1—8 to 18 inches; strong brown (7.5YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; friable; few fine roots; common faint clay films on faces of peds; few fine black concretions; slightly acid; gradual smooth boundary.

- Bt2—18 to 24 inches; strong brown (7.5YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; common black concretions; slightly acid; clear wavy boundary.

- Bt3—24 to 30 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; common fine and medium black concretions and stains; slightly acid; clear wavy boundary.

- 2Bt4—30 to 50 inches; yellowish red (5YR 5/6) silty clay; moderate medium subangular blocky structure; firm; many distinct clay films on faces of peds; many fine and medium black concretions and stains; medium acid; clear wavy boundary.

- 2Bt5—50 to 86 inches; red (2.5YR 4/6) silty clay; moderate medium and fine subangular blocky structure; firm; many faint clay films on faces of peds; many fine and medium black concretions and stains; strongly acid; clear smooth boundary.

- 2BC—86 to 96 inches; red (2.5YR 5/6) clay; weak medium and coarse subangular blocky structure; very firm; many faint clay films on faces of peds; common fine black concretions; very strongly acid.

The thickness of the solum is 65 to 100 inches, and the depth to bedrock is 75 to more than 120 inches. The thickness of the silty mantle is 15 to 35 inches. Reaction ranges from strongly acid to neutral to a depth of about 30 inches and from very strongly acid to slightly acid below that depth.

The Ap horizon has hue of 10YR or 7.5YR, value of 4, and chroma of 3 or 4.

The Bt horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. The texture is silt loam or silty clay loam.

The 2Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. Some pedons are mottled in shades of yellowish red or brown. Some have grayish mottles in the lower part of this horizon. The texture is silty clay or clay.

Some pedons have a 2C horizon. The 2BC and 2C horizons have colors and textures similar to those of the 2Bt horizon.

Cynthiana Series

The Cynthiana series consists of shallow, well drained or somewhat excessively drained soils that are moderately slowly permeable. These soils formed in material weathered from limestone or interbedded limestone and calcareous shale. They are on ridgetops and side slopes in the central part of the county. Slopes range from 6 to 35 percent. The soils are clayey, mixed, mesic Lithic Hapludalfs.

Cynthiana soils are associated on the landscape with Eden, Fairmount, Faywood, Lowell, and Woolper soils. Eden, Faywood, Lowell, and Woolper soils are in a fine textured family. Eden and Faywood soils are moderately deep over bedrock. Lowell and Woolper soils are deep or very deep over bedrock. Woolper and Fairmount soils have a mollic epipedon.

Typical pedon of Cynthiana silty clay loam, in an area of Cynthiana-Faywood complex, very rocky, 12 to 35 percent slopes, eroded; about 1.5 miles southeast of Tilton, 0.4 mile south of Kentucky Highway 697, about 110 feet south of a barn, in a pasture; soil map sheet 20; about 2,145,500 feet east and 302,060 feet north by the Kentucky coordinate grid system:

- Ap—0 to 2 inches; brown (10YR 4/3) silty clay loam; moderate medium subgranular blocky structure; firm; common fine and medium roots; mildly alkaline; clear smooth boundary.
- Bt—2 to 8 inches; light olive brown (2.5Y 5/4) flaggy clay; moderate medium subangular blocky structure; firm; few fine roots; common faint clay films on faces of peds; about 15 percent limestone and weathered shale fragments; mildly alkaline; clear smooth boundary.
- BC—8 to 18 inches; light olive brown (2.5Y 5/4) and yellowish brown (10YR 5/6) flaggy silty clay; weak fine subangular blocky structure; firm; few medium roots; few faint clay films on faces of peds; about 15 percent limestone and calcareous shale fragments; mildly alkaline; abrupt smooth boundary.
- R—18 inches; limestone bedrock.

The thickness of the solum and the depth to bedrock range from 10 to 20 inches. Reaction ranges from slightly acid to mildly alkaline throughout the solum. The content of thin, flat limestone fragments 2 to 15 inches across ranges from 0 to 15 percent in the Ap horizon and from 10 to 30 percent in the Bt and BC horizons.

The Ap horizon has hue of 10YR, value of 4, and chroma of 2 to 4. The Bt horizon has hue of 10YR to 2.5Y, value of 4 or 5, and chroma of 4 to 6. This horizon is silty clay, clay, or the flaggy or channery analogs of those textures. The BC horizon has colors and textures similar to those of the Bt horizon.

Eden Series

The Eden series consists of moderately deep, well drained soils that are slowly permeable. These soils formed in material weathered from interbedded calcareous shale, siltstone, and limestone. They are on narrow ridgetops and side slopes in the western part of the county. Slopes range from 6 to 35 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Eden soils are associated on the landscape with Allegheny, Cynthiana, Fairmount, Faywood, Lowell, Nicholson, and Woolper soils. Allegheny soils are in a fine-loamy family and are very deep over bedrock. Cynthiana and Fairmount soils are in a clayey family and are shallow over bedrock. Fairmount soils have a mollic epipedon. Faywood soils are moderately deep over hard bedrock. Lowell soils are deep or very deep over bedrock. Woolper soils are very deep over bedrock and have a mollic epipedon. Nicholson soils are in a fine-silty family, are moderately well drained, and have a fragipan.

Typical pedon of Eden flaggy silty clay loam, 20 to 35 percent slopes, eroded; about 1.8 miles southwest of Fairview, 670 yards south of the junction of U.S. Highway 68 and Kentucky Highway 2505, about 235 yards northwest of a barn, 100 feet west of a farm road, in an area of woodland; soil map sheet 3; about 2,082,760 feet east and 345,040 feet north by the Kentucky coordinate grid system:

- Ap—0 to 3 inches; brown (10YR 4/3) flaggy silty clay loam; weak fine granular structure; friable; many fine and medium roots; about 15 percent limestone flagstones 6 to 10 inches long; moderately alkaline; clear wavy boundary.
- AB—3 to 7 inches; brown (10YR 4/3) and yellowish brown (10YR 5/6) flaggy silty clay; weak fine granular and weak medium subangular blocky structure; friable; many medium and coarse roots; few faint clay films on faces of peds; about 15 percent limestone flagstones; neutral; abrupt smooth boundary.
- Bt—7 to 16 inches; yellowish brown (10YR 5/6) flaggy clay; moderate medium subangular blocky structure; firm; common medium and coarse roots; many distinct clay films on faces of peds; about 15 percent limestone flagstones; neutral; gradual wavy boundary.
- BC—16 to 28 inches; light olive brown (2.5Y 5/4) very flaggy silty clay; common medium distinct yellowish brown (10YR 5/6) and pale brown (10YR 6/3) and few fine faint light brownish gray mottles; weak fine angular blocky structure; firm; few fine to coarse roots; about 35 percent limestone flagstones and

thin, flat fragments of yellowish brown and olive, weathered shale; neutral; gradual smooth boundary.
Cr—28 to 35 inches; interbedded, soft, brown, gray, and olive shale that has layered limestone.

The thickness of the solum is 16 to 40 inches, and the depth to weathered bedrock of interbedded calcareous shale, siltstone, and limestone is 20 to 40 inches. Reaction ranges from very strongly acid to moderately alkaline in the solum.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. This horizon is silty clay loam, silty clay, or the flaggy analogs of those textures.

The AB horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 to 6. The textures are similar to those of the Ap horizon.

The Bt horizon has hue of 10YR to 5Y, value of 4 or 5, and chroma of 3 to 6. This horizon is silty clay, clay, or the flaggy analogs of those textures.

The BC horizon has hue of 10YR to 5Y, value of 5 or 6, and chroma of 2 to 6. Chroma of 2 is 10 inches or more below the top of the Bt horizon. Most pedons are mottled in shades of brown, gray, or olive. This horizon is silty clay, clay, or the flaggy or very flaggy analogs of those textures.

Some pedons have a C horizon. This horizon has colors similar to those of the BC horizon. Reaction ranges from neutral to moderately alkaline. The content of limestone flagstones and shale fragments ranges from 25 to 75 percent. This horizon is silty clay, clay, or the flaggy or very flaggy analogs of those textures.

Elk Series

The Elk series consists of very deep, well drained soils that are moderately permeable. These soils formed in alluvium derived from limestone, siltstone, shale, and loess. They are on stream terraces along the larger streams throughout the county. Slopes range from 2 to 12 percent. The soils are fine-silty, mixed, mesic Ultic Hapludalfs.

Elk soils are associated on the landscape with Allegheny, Lawrence, Monongahela, Morehead, and Otwell soils. Allegheny and Monongahela soils are in a fine-loamy family. Monongahela and Otwell soils are moderately well drained and have a fragipan. Lawrence soils are somewhat poorly drained and have a fragipan. Morehead soils are somewhat poorly drained or moderately well drained.

Typical pedon of Elk silt loam, 2 to 6 percent slopes; about 4.5 miles south of Elizaville, 0.6 mile east of the Kentucky Highway 170 bridge over Fleming Creek, 130 yards south of Fleming Creek, in a hay field; soil map sheet 15; about 2,123,960 feet east and 320,480 feet north by the Kentucky coordinate grid system:

Ap—0 to 8 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; very friable; common fine roots; neutral; clear smooth boundary.

BA—8 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure parting to weak fine granular; very friable; few fine roots; mildly alkaline; gradual smooth boundary.

Bt1—14 to 28 inches; dark yellowish brown (10YR 4/6) silty clay loam; weak fine and medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; few fine black concretions; mildly alkaline; gradual smooth boundary.

Bt2—28 to 38 inches; dark yellowish brown (10YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; few very fine roots; common distinct clay films on faces of peds; common fine black concretions; few rounded quartz pebbles; medium acid; gradual smooth boundary.

Bt3—38 to 54 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct light olive brown (2.5Y 5/4) mottles; moderate medium subangular blocky structure; firm; common distinct clay films on faces of peds; common fine and medium black concretions; few rounded quartz pebbles; strongly acid; gradual smooth boundary.

C—54 to 78 inches; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) silty clay loam; few fine distinct light olive brown (2.5Y 5/4) mottles; massive; firm; few fine and very fine roots; common fine black concretions; few rounded quartz pebbles; strongly acid.

The thickness of the solum is 40 to 60 inches, and the depth to bedrock ranges from 5 to more than 10 feet. Unless the soils have been limed, reaction ranges from strongly acid to slightly acid throughout the profile.

The Ap horizon has hue of 10YR or 7.5YR, value of 4, and chroma of 3 or 4. The BA horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. In some pedons it has few fine mottles with chroma of more than 2 in the lower part. In some pedons this horizon has 1 to 5 percent rounded pebbles. The texture is silt loam or silty clay loam.

The C horizon has colors and textures similar to those of the Bt horizon. In some pedons it has 0.1 to 25 percent gravel.

Fairmount Series

The Fairmount series consists of shallow, well drained soils that are slowly permeable or moderately

slowly permeable. These soils formed in material weathered from limestone interbedded with calcareous shale. They are on steep bluffs along the larger streams in the western half of the county and on side slopes in the southern part. Slopes range from 20 to 60 percent. The soils are clayey, mixed, mesic Lithic Hapludolls.

Fairmount soils are associated on the landscape with Cynthiana, Eden, Faywood, and Woolper soils. Cynthiana, Eden, and Faywood soils do not have a mollic epipedon. Eden and Faywood soils are moderately deep over bedrock. Eden, Faywood, and Woolper soils are in a fine textured family. Woolper soils are very deep over bedrock.

Typical pedon of Fairmount flaggy silty clay loam, in an area of Fairmount-Woolper complex, very rocky, 20 to 60 percent slopes; about 0.7 mile southwest of Locust, 330 yards south of the Kick Branch Road crossing on Locust Creek, 270 yards east of Locust Creek, in an area of woodland; soil map sheet 24; about 2,144,880 feet east and 290,080 feet north by the Kentucky coordinate grid system:

A—0 to 2 inches; very dark grayish brown (10YR 3/2) flaggy silty clay loam; moderate fine granular structure; friable; many fine and medium roots; about 16 percent limestone flagstones; moderately alkaline; clear smooth boundary.

AB—2 to 6 inches; dark brown (10YR 3/3) flaggy silty clay loam; moderate fine and medium subangular blocky structure; firm; many fine and common medium and coarse roots; about 15 percent limestone flagstones; moderately alkaline; clear smooth boundary.

Bw—6 to 16 inches; dark yellowish brown (10YR 4/4) flaggy clay; few fine distinct light olive brown (2.5Y 5/4) mottles; moderate medium subangular blocky structure; firm; few fine and medium roots; common distinct clay coatings on faces of peds; about 30 percent limestone flagstones; moderately alkaline; abrupt smooth boundary.

R—16 inches; hard limestone bedrock.

The thickness of the solum and the depth to hard limestone bedrock range from 10 to 20 inches. Reaction ranges from neutral to moderately alkaline in the solum. The content of limestone flagstones 1 to 15 inches long ranges from 5 to 20 percent in the A and AB horizons and from 5 to 35 percent in the Bw horizon.

The A horizon has hue of 10YR, value of 3, and chroma of 1 to 3. The AB horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3.

The Bw horizon has hue of 10YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is silty clay, clay, or the flaggy analogs of those textures.

Faywood Series

The Faywood series consists of moderately deep, well drained soils that are moderately slowly permeable or slowly permeable. These soils formed in material weathered from limestone interbedded with thin layers of shale. They are on ridgetops and side slopes in the central and western parts of the county. Slopes range from 2 to 35 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Faywood soils are associated on the landscape with Cynthiana, Eden, Fairmount, Lowell, Nicholson, Sandview, and Woolper soils. Eden soils are underlain by interbedded limestone, siltstone, and calcareous shale. Cynthiana and Fairmount soils are shallow over bedrock. Fairmount and Woolper soils have a mollic epipedon. Woolper, Nicholson, and Sandview soils are very deep over bedrock. Nicholson and Sandview soils are in a fine-silty family. Nicholson soils are moderately well drained and have a fragipan. Lowell soils are deep or very deep over bedrock.

Typical pedon of Faywood silt loam, in an area of Faywood-Lowell silt loams, 6 to 12 percent slopes, eroded; about 1.7 miles south of Flemingsburg, 0.3 mile west of Kentucky Highway 11, about 230 feet southeast of a sinkhole, in a pasture; soil map sheet 10; about 2,141,400 feet east and 325,440 feet north by the Kentucky coordinate grid system:

Ap—0 to 5 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine roots; slightly acid; clear wavy boundary.

Bt1—5 to 11 inches; dark yellowish brown (10YR 4/4) silty clay; moderate medium subangular blocky structure; friable; many fine roots; common faint clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—11 to 18 inches; yellowish brown (10YR 5/6) clay; moderate medium subangular blocky structure; firm; few medium and fine roots; many distinct clay films on faces of peds; few fine black concretions; strongly acid; gradual wavy boundary.

Bt3—18 to 29 inches; yellowish brown (10YR 5/6) clay; moderate medium subangular and angular blocky structure; firm; few medium and fine roots; many distinct clay films on faces of peds; common black and brown stains; medium acid; gradual wavy boundary.

Bt4—29 to 34 inches; yellowish brown (10YR 5/6) clay; very weak fine subangular blocky structure; firm; common distinct clay films on faces of peds; few fine and coarse roots; few black and brown stains; mildly alkaline; abrupt smooth boundary.

R—34 inches; hard limestone bedrock.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. Reaction ranges from strongly acid to mildly alkaline in the solum. The content of limestone and shale fragments ranges from 0 to 10 percent throughout the solum.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. Some pedons are mottled in shades of brown, olive, or gray in the lower part of this horizon. The texture is silty clay loam, silty clay, or clay.

Some pedons have a C horizon. This horizon has colors and textures similar to those of the lower part of the Bt horizon.

Lawrence Series

The Lawrence series consists of very deep, somewhat poorly drained soils that have a fragipan. These soils are moderately permeable above the fragipan and slowly permeable in the fragipan. They formed in old, mixed alluvium washed from soils that formed in residuum of limestone, siltstone, shale, and sandstone. They are on two distinct landforms in the eastern part of the county. They are on broad flats in the uplands and on stream terraces. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, mesic, Aquic Fragiudalfs.

Lawrence soils are associated on the landscape with Beasley, McGary, Nicholson, and Shrouts soils on uplands and with Allegheny, Elk, Monongahela, and Otwell soils on stream terraces. Allegheny, Elk, Beasley, Shrouts, and McGary soils do not have a fragipan. Beasley, Shrouts, and McGary soils are in a fine textured family. Beasley, Shrouts, Allegheny, and Elk soils are well drained. Beasley soils are deep or very deep over bedrock. Shrouts soils are moderately deep over bedrock. McGary soils are deep over bedrock. Nicholson, Monongahela, and Otwell soils are moderately well drained. Allegheny and Monongahela soils are in a fine-loamy family.

Typical pedon of Lawrence silt loam; about 0.8 mile north of Pleasureville, 0.5 mile northeast of Kentucky Highway 344, about 0.5 mile west of the North Fork of the Licking River, 100 feet southwest of a barn, in a hay field; soil map sheet 2; about 2,184,720 feet east and 360,880 feet north by the Kentucky coordinate grid system:

Ap—0 to 8 inches; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; very friable; many fine roots; common fine distinct strong brown (7.5YR 5/8) iron stains; neutral; abrupt smooth boundary.

Bt1—8 to 13 inches; light yellowish brown (2.5Y 6/4) silt

loam; common fine and medium distinct yellowish brown (10YR 5/8), pale brown (10YR 6/3), and light gray (10YR 7/2) mottles; weak fine and medium subangular blocky structure; friable; common fine roots; common faint clay films on faces of peds; few very fine black concretions and iron stains; very strongly acid; clear smooth boundary.

Bt2—13 to 24 inches; light yellowish brown (2.5Y 6/4) and brownish yellow (10YR 6/6) silty clay loam; many fine and medium distinct light gray (10YR 7/2) mottles; moderate medium and coarse subangular blocky structure parting to weak fine platy; firm; few fine roots; many distinct pale brown (10YR 6/3) clay films on faces of peds; few strong brown (7.5YR 5/8) iron stains; few fine black concretions; very strongly acid; abrupt smooth boundary.

Btx1—24 to 34 inches; mottled light yellowish brown (2.5Y 6/4), yellowish brown (10YR 5/6), and pale brown (10YR 6/3) silty clay loam; many fine and medium distinct light gray (10YR 7/2) streaks between prisms; strong very coarse prismatic structure parting to moderate medium subangular blocky; very firm; brittle; few fine roots between prisms; common faint silt coatings on faces of peds and prisms; common distinct clay films on faces of peds; common iron stains and concretions; very strongly acid; gradual smooth boundary.

Btx2—34 to 52 inches; mottled pale brown (10YR 6/3), yellowish brown (10YR 5/6), and light yellowish brown (2.5Y 6/4) silty clay loam; many medium and coarse light gray (10YR 7/2) and light brownish gray (10YR 6/2) streaks between prisms; few fine faint white mottles; moderate very coarse prismatic structure parting to moderate fine and medium angular blocky; very firm; brittle; few fine roots between prisms; common distinct clay films on faces of peds; few fine iron and black stains; strongly acid; gradual wavy boundary.

2B't—52 to 64 inches; mottled pale brown (10YR 6/3), yellowish brown (10YR 5/6), and light gray (10YR 7/2) silty clay loam; moderate medium subangular blocky structure; very firm; common faint clay films on faces of peds; few iron and black stains; neutral.

The thickness of the solum is 40 to 70 inches, and the depth to limestone or interbedded limestone, calcareous shale, and siltstone ranges from 60 to more than 120 inches. Unless the soils have been limed, reaction ranges from very strongly acid to slightly acid above the fragipan, is strongly acid or very strongly acid in the fragipan, and ranges from very strongly acid to neutral below the fragipan.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 6. It has few to many mottles with chroma of 2 or less. In some pedons it is mottled in shades of brown. The texture is silt loam or silty clay loam.

The Btx horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 8, or it is neutral in hue and has value of 5 to 7. Most pedons are equally mottled in shades of gray and brown. The texture is silt loam or silty clay loam.

The 2B't horizon has colors similar to those of the Btx horizon. The texture is silty clay loam, silty clay, or clay.

Some pedons have a C horizon. This horizon has colors and textures similar to those of the 2B't horizon.

Lowell Series

The Lowell series consists of deep or very deep, well drained soils that are moderately slowly permeable. These soils formed in material weathered from limestone interbedded with thin layers of shale. They are on ridgetops and side slopes throughout the central and western parts of the county. Slopes range from 2 to 20 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Lowell soils are associated on the landscape with Cynthiana, Eden, Faywood, Nicholson, and Sandview soils. Cynthiana soils are in a clayey family and are shallow over bedrock. Eden and Faywood soils are moderately deep over bedrock. Nicholson and Sandview soils are in a fine-silty family. Also, Nicholson soils are moderately well drained and have a fragipan.

Typical pedon of Lowell silt loam, 2 to 6 percent slopes; about 0.3 mile south of the railroad crossing at Nepton, 225 yards southwest of Kentucky Highway 367, about 210 yards northwest of a farm road, 40 feet east of a fence, in a pasture; soil map sheet 9; about 2,118,660 feet east and 339,200 feet north by the Kentucky coordinate grid system:

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; very friable; common fine roots; strongly acid; clear smooth boundary.

BA—7 to 11 inches; strong brown (7.5YR 5/6) and dark yellowish brown (10YR 4/4) silty clay loam; weak fine subangular blocky structure parting to weak fine granular; friable; common fine roots; few fine black concretions; strongly acid; clear smooth boundary.

Bt1—11 to 19 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium and fine subangular blocky structure; friable; common fine roots; common faint clay films on faces of peds; common

black concretions and stains; strongly acid; clear smooth boundary.

Bt2—19 to 25 inches; yellowish brown (10YR 5/6) silty clay; moderate medium subangular blocky structure; firm; common fine roots; many distinct clay films on faces of peds; many black concretions and stains; strongly acid; clear smooth boundary.

Bt3—25 to 32 inches; yellowish brown (10YR 5/6) clay; strong medium angular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; strongly acid; abrupt smooth boundary.

Bt4—32 to 47 inches; yellowish brown (10YR 5/6) clay; common fine faint pale brown (10YR 6/3) and yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; firm; few faint clay films on faces of peds; common black and brown stains; strongly acid; clear smooth boundary.

C—47 to 60 inches; olive yellow (2.5Y 6/6) clay; massive; about 10 percent weathered shale fragments; neutral.

The thickness of the solum is 40 to 60 inches, and the depth to hard limestone or interbedded limestone and shale is more than 40 inches. Reaction ranges from very strongly acid to slightly acid in the upper part of the solum and from strongly acid to mildly alkaline in the lower part of the solum and in the C horizon. The content of limestone and shale fragments ranges from 0 to 5 percent in the upper part of the solum, from 0 to 15 percent in the lower part of the solum, and from 1 to 50 percent in the C horizon.

The Ap horizon has hue of 7.5YR or 10YR, value of 4, and chroma of 2 to 4. The BA horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 4 to 8. Most pedons are mottled in shades of brown, red, gray, or olive in the lower part of this horizon. The texture is silty clay loam, silty clay, or clay in the upper part of this horizon and silty clay or clay in the lower part.

The C horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 to 8. The fine-earth fraction is silty clay or clay.

McGary Series

The McGary series consists of deep, somewhat poorly drained soils that are slowly permeable or very slowly permeable. These soils formed in clayey sediments underlain by material weathered from calcareous shale and dolomite. They are on broad flats in the uplands below the Knobs area in the central and northern parts of the county. Slopes range from 0 to 2 percent.

McGary soils are fine, mixed, mesic Aeric

Ochraqualfs. In most areas of this county, these soils formed in clayey sediments 40 to 60 inches deep over material weathered from calcareous shale and dolomite. They differ from the typical McGary soils because they have a strongly acid Bt horizon having a range in color that includes hue of 5Y and chroma of 8. Also, the 2C horizon typically has hue of 7.5YR and chroma of 8. These differences do not significantly affect the use, management, or behavior of the soils.

McGary soils are associated on the landscape with Beasley, Lawrence, and Nicholson soils. Beasley soils are well drained and formed in residuum of calcareous shale, siltstone, limestone, and dolomite. Lawrence and Nicholson soils are in a fine-silty family, have a fragipan, and are very deep over bedrock. Also, Nicholson soils are moderately well drained.

Typical pedon of McGary silt loam; about 0.5 mile west of Beechburg, 230 yards north of Kentucky Highway 402, about 100 feet east of a farm road, in a crop field; soil map sheet 7; about 2,171,360 feet east and 345,080 feet north by the Kentucky coordinate grid system:

Ap—0 to 8 inches; brown (10YR 5/3) silt loam; common medium faint yellowish brown (10YR 5/8) mottles; weak medium platy structure in the upper part and weak medium subangular blocky structure parting to angular blocky in the lower part; friable; many fine roots; neutral; abrupt wavy boundary.

Bt1—8 to 14 inches; brownish yellow (10YR 6/6) silty clay loam; many coarse faint brownish gray (10YR 6/3) and common medium distinct light gray (2.5Y 7/2) mottles; moderate medium and coarse angular blocky structure; firm; common fine roots; common distinct clay films on faces of peds; common faint silt coatings on faces of peds; strongly acid; clear wavy boundary.

Bt2—14 to 26 inches; yellowish brown (10YR 5/8) and light olive gray (5Y 6/2) silty clay; common medium faint light yellowish brown (10YR 6/4) mottles; moderate and strong medium angular blocky structure; very firm; few faint clay films on faces of peds; common distinct slickensides and pressure surfaces; strongly acid; clear wavy boundary.

Btg—26 to 39 inches; mottled light gray (5Y 6/1), light olive gray (5Y 6/2), and yellowish brown (10YR 6/8) silty clay; moderate medium angular blocky structure; very firm; few fine roots; few faint clay films on faces of peds; neutral; abrupt wavy boundary.

2C—39 to 48 inches; reddish yellow (7.5YR 6/8) clay; common coarse prominent light greenish gray (5GY 7/1) mottles; massive; firm; very few fine roots; moderately alkaline; abrupt wavy boundary.

2Cr—48 to 54 inches; light yellowish brown (2.5Y 6/4), layered, soft, calcareous shale and dolomite; common coarse distinct greenish gray (5GY 6/1) coatings in seams; common coarse prominent strong brown (7.5YR 5/8) layers of dolomite; moderately alkaline.

The thickness of the solum is 24 to 40 inches, and the depth to calcareous shale and dolomite ranges from 40 to 60 inches. The depth to carbonates ranges from 20 to 55 inches. Reaction is slightly acid or neutral in the Ap horizon, ranges from strongly acid to mildly alkaline in the Bt horizon, and is mildly alkaline or moderately alkaline in the 2C horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 3.

The Bt horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 8. The texture is silty clay loam or silty clay.

The Btg horizon has colors similar to those of the Bt horizon. The texture is silty clay or clay.

The 2C horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 1 to 8. The texture is silty clay or clay.

Melvin Series

The Melvin series consists of very deep, poorly drained soils that are moderately permeable. These soils formed in mixed alluvium on flood plains in the eastern and southern parts of the county. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, nonacid, mesic Typic Fluvaquents.

Melvin soils are associated on the landscape with Morehead, Newark, Nolin, and Skidmore soils. Morehead soils are on low stream terraces, are somewhat poorly drained or moderately well drained, and have an argillic horizon. Newark soils are somewhat poorly drained. Nolin and Skidmore soils are well drained. Also, Skidmore soils are in a loamy-skeletal family.

Typical pedon of Melvin silt loam, frequently flooded; about 0.75 mile east of Beechburg, 80 feet east of Colgan Road, 40 feet west of a creek, in a pasture; soil map sheet 7; about 2,178,600 feet east and 346,160 feet north by the Kentucky coordinate grid system:

Ap—0 to 6 inches; brown (10YR 5/3) silt loam; many medium prominent light brownish gray (2.5Y 6/2), common fine distinct strong brown (7.5YR 5/8), and few fine distinct light olive brown (2.5Y 5/4) mottles; weak medium angular blocky structure parting to weak fine granular; very friable; common fine roots;

about 4 percent rounded pebbles; slightly acid; clear wavy boundary.

Bg1—6 to 13 inches; light brownish gray (10YR 6/2) silt loam; many fine and medium faint pale brown (10YR 6/3) and common fine faint yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few faint silt coatings on faces of peds; common very fine mica flakes; medium acid; gradual wavy boundary.

Bg2—13 to 20 inches; light brownish gray (10YR 6/2) silt loam; common fine and medium faint yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few very fine roots; common faint light yellowish brown (10YR 6/4) silt coatings on faces of peds; few fine manganese concretions; common very fine mica flakes; slightly acid; gradual wavy boundary.

Cg—20 to 62 inches; light brownish gray (2.5Y 6/2) silt loam; common medium and coarse prominent strong brown (7.5YR 5/8) and common medium distinct brownish yellow (10YR 6/6) mottles; massive; friable; few fine roots; common faint silt coatings on pressure surfaces; many very fine mica flakes; neutral.

The thickness of the solum is 20 to 40 inches, and the depth to bedrock ranges from 60 inches to more than 15 feet. Reaction ranges from medium acid to mildly alkaline throughout the profile. The content of rounded pebbles ranges from 0 to 5 percent to a depth of 30 inches and from 0 to 20 percent below that depth.

The Ap horizon has hue of 10YR to 5Y, value of 3 to 7, and chroma of 1 to 3.

The Bg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 5 to 7. It has mottles in shades of brown. The texture is silt loam or silty clay loam.

The Cg horizon has colors and textures similar to those of the Bg horizon. Some pedons have strata of silt, sand, clay, or gravel below a depth of 40 inches.

Monongahela Series

The Monongahela series consists of very deep, moderately well drained soils that have a fragipan. These soils are moderately permeable above the fragipan and moderately slowly permeable or slowly permeable in the fragipan. They formed in old alluvial material eroded from areas of sandstone, siltstone, and shale on uplands. They are on two distinct landforms along the Licking River in the southern part of the county. They are on stream terraces and in areas of older terrace deposits on uplands along the Licking River. Slopes range from 2 to 12 percent. The soils are

fine-loamy, mixed, mesic Typic Fragiudults.

Monongahela soils are associated on the landscape with Allegheny, Elk, and Lawrence soils on stream terraces and with Beasley and Eden soils on uplands. Allegheny, Elk, Beasley, and Eden soils are well drained and do not have a fragipan. Elk and Lawrence soils are in a fine-silty family. Lawrence soils are somewhat poorly drained. Beasley and Eden soils are in a fine textured family. Beasley soils are deep or very deep over bedrock. Eden soils are moderately deep over bedrock.

Typical pedon of Monongahela loam, 2 to 6 percent slopes; about 1.8 miles southwest of Hillsboro, 300 yards southwest of Kentucky Highway 158, about 130 yards north-northwest of a farm gate, 182 feet north of a barn, in a tobacco field; soil map sheet 25; about 2,159,720 feet east and 282,480 feet north by the Kentucky coordinate grid system:

Ap—0 to 8 inches; brown (10YR 4/3) loam; weak fine subangular blocky structure parting to weak fine granular; friable; common fine roots; common fine black concretions; medium acid; abrupt smooth boundary.

Bt1—8 to 19 inches; yellowish brown (10YR 5/6) silt loam; moderate fine and medium subangular blocky structure; firm; few very fine and fine roots; few faint clay films on faces of peds; common fine black concretions; few fine rounded quartz pebbles; medium acid; clear wavy boundary.

Bt2—19 to 25 inches; brownish yellow (10YR 6/6) silt loam; common fine faint light gray (10YR 7/2) and pale brown (10YR 6/3) mottles; moderate fine and medium subangular blocky structure; firm; few fine roots; common faint clay films on faces of peds; common fine black and brown concretions; few fine rounded quartz pebbles; very strongly acid; clear smooth boundary.

Btx—25 to 40 inches; brownish yellow (10YR 6/6) silt loam; common medium faint light gray (10YR 7/2) and pale brown (10YR 6/3) mottles; strong very coarse prismatic structure parting to medium subangular blocky; very firm; brittle; few fine roots between prisms; common faint clay films on faces of peds; common black and brown stains and concretions; very strongly acid; clear smooth boundary.

B't—40 to 63 inches; brownish yellow (10YR 6/6) silty clay loam; few to many distinct medium yellowish brown (10YR 5/6), light gray (10YR 7/2), and pale brown (10YR 6/3) mottles; moderate fine subangular blocky structure; very firm; many faint clay films on faces of peds; common black and

brown stains and concretions; few small rounded quartz pebbles; very strongly acid; clear wavy boundary.

BC—63 to 72 inches; mottled brownish yellow (10YR 6/6) and light gray (10YR 7/2) silty clay loam; weak coarse subangular blocky structure; very firm; many medium and coarse black coatings and concretions; common brown rounded quartz pebbles; very strongly acid.

The thickness of the solum is 40 to 72 inches, and the depth to bedrock is more than 60 inches. Unless the soils have been limed, reaction is very strongly acid or strongly acid throughout the profile. The content of rounded quartz pebbles ranges from 0 to 15 percent above the fragipan, from 0 to 25 percent in the fragipan, and from 2 to 20 percent below the fragipan.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. The texture is silt loam, loam, silty clay loam, clay loam, or sandy clay loam.

The Btx horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 2 to 6. This horizon has mottles or streaks in shades of gray or brown. The fine-earth fraction is silt loam, loam, sandy clay loam, or clay loam.

The B't horizon has colors similar to those of the Btx horizon. The fine-earth fraction is silt loam, loam, silty clay loam, or clay loam.

The BC horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 2 to 8. This horizon has mottles in shades of brown, yellow, or gray. The fine-earth fraction is silt loam, loam, silty clay loam, or clay loam.

Morehead Series

The Morehead series consists of very deep, somewhat poorly drained or moderately well drained soils that are moderately permeable. These soils formed in mixed alluvium. They are on low stream terraces along Fox Creek in the eastern part of the county. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, mesic Aquic Hapludults.

Morehead soils are associated on the landscape with Elk, Melvin, Newark, Nolin, Otwell, and Skidmore soils. Elk soils are on stream terraces and are well drained. Melvin, Newark, Nolin, and Skidmore soils are on flood plains and do not have an argillic horizon. Newark soils are somewhat poorly drained. Melvin soils are poorly drained. Nolin and Skidmore soils are well drained. Skidmore soils are in a loamy-skeletal family. Otwell soils are on stream terraces, are moderately well drained or well drained, and have a fragipan.

Typical pedon of Morehead silt loam, rarely flooded;

about 0.3 mile south of Plummers Mill, 180 yards west of Kentucky Highway 32, about 150 yards east of Fox Creek, in a hay field; soil map sheet 26; about 2,194,480 feet east and 290,680 feet north by the Kentucky coordinate grid system:

Ap—0 to 10 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; very friable; many fine roots; medium acid; clear smooth boundary.

Bt1—10 to 18 inches; yellowish brown (10YR 5/6) silty clay loam; common fine distinct light brownish gray (2.5Y 6/2) and light olive brown (2.5Y 5/4) mottles; weak fine and medium subangular blocky structure; firm; common fine roots; common faint clay films on faces of peds; few faint brown silt coatings on faces of peds; very strongly acid; clear smooth boundary.

Bt2—18 to 24 inches; brownish yellow (10YR 6/6) silty clay loam; common fine faint light gray (10YR 6/2) and pale brown (10YR 6/3) and common fine distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; many faint clay films on faces of peds; few fine black stains; very strongly acid; clear smooth boundary.

Bt3—24 to 44 inches; light yellowish brown (10YR 6/4) and brownish yellow (10YR 6/6) silty clay loam; common fine and medium faint pale brown (10YR 6/3) and light gray (10YR 7/1) and common fine and medium distinct strong brown (7.5YR 5/6) mottles; moderate medium and coarse subangular blocky structure; firm; few fine roots; many distinct clay films on faces of peds; few faint brown silt coatings on faces of peds; common iron and manganese stains in the lower part; very strongly acid; clear smooth boundary.

Bt4—44 to 51 inches; brownish yellow (10YR 6/6) silty clay loam; common fine faint light gray (10YR 6/2) and common fine distinct strong brown (7.5YR 5/6) mottles; weak medium and coarse subangular blocky structure; firm; few fine roots; many distinct clay films on faces of peds; few fine pores; very strongly acid; clear smooth boundary.

Bt5—51 to 58 inches; yellowish brown (10YR 5/6) silty clay loam; common medium faint light gray (10YR 7/1) and common medium distinct strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; many distinct clay films on faces of peds; few iron and black stains; very strongly acid; clear smooth boundary.

C1—58 to 71 inches; yellowish brown (10YR 5/6) silt loam; common medium faint light gray (10YR 7/1) and pale brown (10YR 6/3) mottles; massive; firm; common faint silt coatings; few fine black

concretions; very strongly acid; gradual wavy boundary.

C2—71 to 95 inches; yellowish brown (10YR 5/6) silt loam; common fine and medium distinct light gray (10YR 7/1) and few fine distinct pale brown (10YR 6/3) mottles; massive; few fine black concretions; strongly acid.

The thickness of the solum is 40 to 60 inches, and the depth to bedrock ranges from 5 to more than 10 feet. Unless the soils have been limed, reaction is very strongly acid or strongly acid throughout the profile.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 6. It is mottled in shades of gray or brown. Many of the mottles have chroma of 2 or less. The texture is silt loam or silty clay loam.

The C horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 6. It is mottled in shades of gray or brown. This horizon is silt loam or silty clay loam. Some pedons are stratified.

Muse Series

The Muse series consists of deep or very deep, well drained soils that are slowly permeable. These soils formed in residuum or colluvium derived from acid, black fissile shale, sandstone, and siltstone. They are on side slopes, foot slopes, and benches in the eastern part of the county. Slopes range from 2 to 55 percent. The soils are clayey, mixed, mesic Typic Hapludults.

Muse soils are associated on the landscape with Berks, Brownsville, Colyer, Shelocta, Shrouts, and Trappist soils. Berks and Brownsville soils are in a loamy-skeletal family and do not have an argillic horizon. Berks and Trappist soils are moderately deep over bedrock. Colyer soils are in a clayey-skeletal family and are shallow over bedrock. Shelocta soils are in a fine-loamy family. Shrouts soils are in a fine textured family and are moderately deep over calcareous shale.

Typical pedon of Muse channery silt loam, in an area of Muse-Trappist silt loams, 20 to 55 percent slopes, eroded; about 1 mile north of Wallingford, 200 yards north of an old house site, 200 yards west of a dirt road, in an area of woodland; soil map sheet 17; about 2,182,120 feet east and 335,800 feet north by the Kentucky coordinate grid system:

A—0 to 3 inches; dark brown (10YR 3/3) channery silt loam; moderate fine and medium subangular blocky structure; friable; many fine and medium roots; about 16 percent sandstone fragments as much as

5 inches long; strongly acid; clear smooth boundary.

Bt1—3 to 11 inches; strong brown (7.5YR 5/8) silty clay; moderate and strong medium angular blocky structure; firm; common fine and medium roots; many distinct yellowish brown (10YR 5/6) clay films on faces of peds; 5 to 10 percent sandstone fragments; less than 5 percent black fissile shale fragments; very strongly acid; clear smooth boundary.

Bt2—11 to 20 inches; yellowish red (5YR 5/6) very channery clay; strong fine and medium angular blocky structure parting to fine and medium subangular blocky; firm; common fine to coarse roots; many distinct strong brown (7.5YR 5/6) clay films on faces of peds; about 35 percent black fissile shale fragments; very strongly acid; abrupt smooth boundary.

Bt3—20 to 39 inches; yellowish red (5YR 5/8) clay; moderate medium subangular blocky structure parting to moderate fine angular blocky; firm; common fine and medium roots; few faint clay films on faces of peds; about 10 percent black fissile shale fragments and 2 percent sandstone fragments; extremely acid; clear smooth boundary.

Bt4—39 to 46 inches; yellowish brown (5YR 5/6) silty clay; moderate fine and medium subangular blocky structure; firm; few fine and medium roots; few faint clay films on faces of peds; about 5 percent sandstone and black fissile shale fragments; extremely acid; clear smooth boundary.

2C—46 to 59 inches; mottled red (2.5YR 4/6), brownish yellow (10YR 6/6), and light gray (10YR 6/1) channery silty clay; massive; firm; few fine roots; about 30 percent black fissile shale fragments; extremely acid; abrupt smooth boundary.

2R—59 inches; hard, black fissile shale.

The thickness of the solum is 40 to 60 inches, and the depth to bedrock is more than 40 inches. Unless the soils have been limed, reaction ranges from extremely acid to strongly acid in the solum and the 2C horizon. The content of black fissile shale, siltstone, and sandstone fragments ranges from 0 to 35 percent in the solum and from 0 to 60 percent in the 2C horizon.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 4.

The Bt horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 4 to 8. In some pedons it is mottled in shades of brown or red in the lower part. This horizon is silty clay loam, silty clay, clay, or the channery or very channery analogs of those textures.

The 2C horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 1 to 6. Some pedons are mottled in

shades of red, brown, yellow, or gray. This horizon is silty clay, clay, or the channery or very channery analogs of those textures.

Newark Series

The Newark series consists of very deep, somewhat poorly drained soils that are moderately permeable. These soils formed in mixed alluvium derived from limestone, shale, siltstone, and sandstone. They are on flood plains throughout the county. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, nonacid, mesic Aeric Fluvaquents.

Newark soils are associated on the landscape with Boonesboro, Melvin, Morehead, Nolin, Skidmore, and Woolper soils. Boonesboro soils are in a fine-loamy family, are moderately deep over bedrock, and have a mollic epipedon. Boonesboro, Nolin, and Skidmore soils are well drained. Skidmore soils are in a loamy-skeletal family. Melvin soils are poorly drained. Morehead soils are on low stream terraces, have an argillic horizon, and are somewhat poorly drained or moderately well drained. Woolper soils are on low stream terraces and are well drained. They are in a fine textured family and have a mollic epipedon.

Typical pedon of Newark silt loam, occasionally flooded; about 0.6 mile northeast of Beechburg, 135 yards north of Colgan Road, 135 yards west of a creek, under a power line, in a hay field; soil map sheet 7; about 2,177,820 feet east and 346,980 feet north by the Kentucky coordinate grid system:

- Ap—0 to 8 inches; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; friable; many fine roots; few fine strong brown (7.5YR 5/6) iron stains; few fine iron concretions; moderately alkaline; clear smooth boundary.
- Bw—8 to 15 inches; light olive brown (2.5Y 5/4) silt loam; few fine distinct light brownish gray (10YR 6/2) mottles; weak fine and medium subangular blocky structure; friable; few fine roots; few faint silt coatings on faces of peds; common fine distinct yellowish brown (10YR 5/6) iron stains; few fine and medium iron concretions; slightly acid; clear wavy boundary.
- Bg—15 to 22 inches; light gray (10YR 7/2) silt loam; many fine and medium distinct light yellowish brown (2.5Y 6/4) and brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable; few fine roots; common faint silt coatings on faces of peds; few fine concretions; medium acid; clear smooth boundary.
- Cg1—22 to 31 inches; light brownish gray (10YR 6/2) silt loam; many medium distinct yellowish brown (10YR 5/8) and common medium faint pale brown

(10YR 6/3) mottles; massive; friable; few fine roots; common faint silt coatings along root channels and on pressure surfaces; few fine iron concretions; medium acid; clear wavy boundary.

Cg2—31 to 52 inches; light gray (10YR 7/2) silt loam; many medium distinct brownish yellow (10YR 6/8) and many medium faint pale brown (10YR 6/3) mottles; massive; friable; few fine roots; common faint silt coatings along root channels and on pressure surfaces; few very fine iron concretions; medium acid; gradual smooth boundary.

Cg3—52 to 62 inches; light gray (10YR 7/2) silt loam; many medium and coarse distinct olive yellow (2.5Y 6/6) and common medium and coarse faint light brownish gray (10YR 6/2) mottles; massive; firm; common medium black stains; common medium iron concretions; medium acid.

The thickness of the solum is 22 to 44 inches, and the depth to bedrock is more than 60 inches. Reaction ranges from medium acid to moderately alkaline throughout the profile. The content of rock fragments, mostly pebbles, ranges from 0 to 5 percent within a depth of 30 inches. It can be as much as 15 percent below a depth of 30 inches and 60 percent below a depth of 40 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4.

The Bw horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. This horizon is mottled in shades of brown or gray. The texture is silt loam or silty clay loam.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. This horizon is mottled in shades of brown. The texture is silt loam or silty clay loam.

The Cg horizon has colors similar to those of the Bg horizon. This horizon is mottled in shades of brown or olive. The fine-earth fraction is silt loam or silty clay loam.

Some pedons have a C horizon. This horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 to 4. The fine-earth fraction is silt loam or silty clay loam.

Nicholson Series

The Nicholson series consists of very deep, moderately well drained soils that have a fragipan. These soils are moderately permeable above the fragipan and slowly permeable in the fragipan. They formed in a mantle of silty material and in the underlying material weathered from limestone, calcareous shale, and siltstone. They are on ridgetops and side slopes in the western two-thirds of the county.

Slopes range from 2 to 12 percent. The soils are fine-silty, mixed, mesic Typic Fragiudalfs.

Nicholson soils are associated on the landscape with Beasley, Crider, Eden, Faywood, Lawrence, Lowell, McGary, and Sandview soils. Beasley, Eden, Faywood, Lowell, and McGary soils are in a fine textured family and do not have a fragipan. Beasley, Crider, Eden, Faywood, Lowell, and Sandview soils are well drained. Beasley and Lowell soils are deep or very deep over bedrock. Eden and Faywood soils are moderately deep over bedrock. McGary soils are somewhat poorly drained and are deep over bedrock. Crider and Sandview soils do not have a fragipan. Lawrence soils are somewhat poorly drained.

Typical pedon of Nicholson silt loam, 2 to 6 percent slopes; about 1 mile southwest of Ewing, 270 yards northwest of Kentucky Highway 560, about 230 yards south of a farmhouse, in a cornfield; soil map sheet 9; about 2,105,680 feet east and 335,400 feet north by the Kentucky coordinate grid system:

- Ap—0 to 9 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; few fine roots; few fine black concretions; neutral; clear smooth boundary.
- Bt1—9 to 20 inches; yellowish brown (10YR 5/6) silt loam; weak fine subangular blocky structure parting to weak fine granular; friable; few fine roots; few faint clay films on faces of peds; few fine dark yellowish brown stains on faces of peds; few fine black concretions; slightly acid; clear smooth boundary.
- Bt2—20 to 28 inches; yellowish brown (10YR 5/6) silty clay loam; few fine faint pale brown and few fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; many faint clay films on faces of peds; common fine and medium black concretions and stains; slightly acid; clear smooth boundary.
- Btx1—28 to 32 inches; yellowish brown (10YR 5/6) silty clay loam; common fine and medium faint light gray (10YR 7/2) and light yellowish brown (10YR 6/4) mottles; weak medium prismatic structure parting to weak medium subangular blocky; very firm; brittle; common distinct clay films on faces of peds; common fine and medium black stains and concretions; strongly acid; clear smooth boundary.
- Btx2—32 to 41 inches; yellowish brown (10YR 5/4) silty clay loam; many medium and coarse faint light gray (10YR 7/2) and distinct strong brown (7.5YR 5/6) mottles and streaks; weak very coarse prismatic structure; very firm; brittle; many faint clay films on faces of peds; few fine black stains and concretions; strongly acid; clear smooth boundary.

2B't—41 to 54 inches; yellowish brown (10YR 5/4) clay; common medium faint gray (10YR 5/1), light brownish gray (10YR 6/2), and strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; very firm; common faint clay films on faces of peds; many black stains and concretions; medium acid; clear smooth boundary.

2C—54 to 74 inches; mottled yellowish brown (10YR 5/6), light brownish gray (2.5Y 6/2), and strong brown (7.5YR 5/8) clay; massive; very firm; common fine and medium black stains and concretions; medium acid.

The thickness of the solum is 40 to 70 inches, and the depth to limestone, calcareous shale, or siltstone is more than 60 inches. Unless the soils have been limed, reaction ranges from very strongly acid to slightly acid in the fragipan and from strongly acid to mildly alkaline below the fragipan.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. Some pedons have mottles with chroma of 2 or less below the upper 10 inches of the argillic horizon. This horizon is silt loam or silty clay loam.

The Btx horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. This horizon has few to many mottles with chroma of 2 or less. The texture is silt loam or silty clay loam.

The 2B't horizon has hue of 5YR to 2.5Y, value of 4 or 5, and chroma of 4 to 6. Most pedons have high- and low-chroma mottles. The texture is silty clay loam, silty clay, or clay.

The 2C horizon has colors and textures similar to those of the 2B't horizon.

Nolin Series

The Nolin series consists of very deep, well drained soils that are moderately permeable. These soils formed in alluvium derived from limestone, sandstone, siltstone, and loess. They are on flood plains throughout the county. Slopes range from 0 to 2 percent. The soils are fine-silty, mixed, mesic Dystric Fluventic Euthrochrepts.

Nolin soils are associated on the landscape with Boonesboro, Melvin, Morehead, Newark, Skidmore, and Woolper soils. Boonesboro soils are in a fine-loamy family, are moderately deep over bedrock, and have a mollic epipedon. Melvin soils are poorly drained. Morehead soils are on low stream terraces, are somewhat poorly drained or moderately well drained, and have an argillic horizon. Newark soils are somewhat poorly drained. Skidmore soils are in a

loamy-skeletal family. Woolper soils are on low stream terraces, are in a fine textured family, and have a mollic epipedon.

Typical pedon of Nolin silt loam, occasionally flooded; about 3 miles south of Bald Hill, 110 yards south of the confluence of Hillsboro Branch and Locust Creek, 50 yards west of Hillsboro Branch; soil map sheet 21; about 2,156,400 feet east and 297,600 feet north by the Kentucky coordinate grid system:

- Ap—0 to 8 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; common fine roots; moderately alkaline; gradual smooth boundary.
- Bw1—8 to 27 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure; friable; few fine roots; moderately alkaline; gradual smooth boundary.
- Bw2—27 to 53 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; very few fine roots; about 2 percent small pebbles; moderately alkaline; abrupt smooth boundary.
- C—53 to 65 inches; brown (10YR 4/3) very gravelly silt loam; massive; friable; about 35 percent subangular chert and rounded gravel; moderately alkaline.

The solum is 40 or more inches thick, and the depth to bedrock is more than 60 inches. Reaction generally ranges from medium acid to moderately alkaline, but in some pedons it is strongly acid in the lower part of the solum and in the C horizon. The content of subrounded chert and small pebbles ranges from 0 to 5 percent in the solum and from 0 to 35 percent in the substratum.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The Bw horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 or 4. The texture is silt loam or silty clay loam.

The C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. This horizon is silt loam, silty clay loam, loam, fine sandy loam, or the gravelly or very gravelly analogs of those textures. In some pedons it is stratified.

Otwell Series

The Otwell series consists of very deep, moderately well drained soils that have a fragipan. These soils are moderately slowly permeable above the fragipan and very slowly permeable in the fragipan. They formed in old alluvial sediments washed from areas of loess and weathered limestone, siltstone, and calcareous shale on uplands. They are on stream terraces along the larger streams throughout the county. Slopes range from 2 to

12 percent. The soils are fine-silty, mixed, mesic Typic Fragiudalfs.

Otwell soils are associated on the landscape with Allegheny, Elk, Lawrence, and Morehead soils. Allegheny soils are in a fine-loamy family. Allegheny and Elk soils are well drained and do not have a fragipan. Lawrence soils are somewhat poorly drained. Morehead soils are somewhat poorly drained or well drained and do not have a fragipan.

Typical pedon of Otwell silt loam, 2 to 6 percent slopes; about 2 miles north of Ewing, 0.7 mile southwest of the junction of Kentucky Highway 560 and Johnson Creek Road, 200 yards north of a farm road, 200 feet south of Johnson Creek, in a cornfield; soil map sheet 4; about 2,105,480 feet east and 348,920 feet north by the Kentucky coordinate grid system:

- Ap—0 to 10 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; few fine roots; few fine black concretions; slightly acid; clear smooth boundary.
- Bt1—10 to 22 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; few fine roots; common faint clay films on faces of peds; few fine black concretions; strongly acid; gradual smooth boundary.
- Bt2—22 to 30 inches; yellowish brown (10YR 5/4) silt loam; common fine faint yellowish brown (10YR 5/8) and few fine faint pale brown and light brownish gray mottles; moderate fine and medium subangular blocky structure; friable; few fine roots; common faint clay films on faces of peds; few fine black concretions; very strongly acid; clear smooth boundary.
- Btx1—30 to 34 inches; yellowish brown (10YR 5/4) silt loam; common fine faint light brownish gray (10YR 6/2) and yellowish brown (10YR 5/8) and few fine faint light gray mottles; moderate medium prismatic structure parting to strong fine and medium subangular blocky; very firm; brittle; common faint clay films on faces of peds; common fine black streaks and concretions; about 10 percent semirounded pebbles; very strongly acid; clear wavy boundary.
- Btx2—34 to 44 inches; yellowish brown (10YR 5/6) silt loam; common fine and medium faint grayish brown (10YR 5/2) and pale brown (10YR 6/3) mottles; strong very coarse prismatic structure parting to strong medium subangular blocky; very firm; brittle; common faint clay films on faces of peds; common fine black streaks and concretions; very strongly acid; clear wavy boundary.
- Btx3—44 to 56 inches; yellowish brown (10YR 5/6) silty clay loam; common fine faint light brownish gray

(10YR 6/2) and few fine faint light gray mottles; moderate coarse prismatic structure parting to moderate medium platy; very firm; brittle; common faint clay films on faces of peds; common fine black streaks and concretions; very strongly acid; gradual wavy boundary.

C—56 to 77 inches; mottled strong brown (7.5YR 5/8), light brownish gray (10YR 6/2), and light gray (10YR 7/2) silty clay loam; massive; many medium and coarse black concretions and stains; about 5 percent siltstone gravel; slightly acid.

The thickness of the solum is 40 to 80 inches, and the depth to bedrock is more than 60 inches. Reaction ranges from very strongly acid to neutral in the Ap horizon, is very strongly acid or strongly acid in the Bt and Btx horizons, and ranges from strongly acid to moderately alkaline below the fragipan.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4.

The Bt horizon has hue of 10YR and value and chroma of 4 to 6. Most pedons are mottled in shades of brown. Below the upper 10 inches of the argillic horizon, some pedons are mottled in shades of gray.

The Btx horizon has hue of 10YR, value of 5 or 6, and chroma of 2 to 8. This horizon is mottled in shades of gray or brown. The texture is silt loam or silty clay loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 2 to 8. This horizon is mottled. It has 0 to 5 percent gravel. The texture is silt loam, silty clay loam, or silty clay.

Sandview Series

The Sandview series consists of very deep, well drained soils that are moderately permeable in the upper part of the solum and moderately slowly permeable in the lower part. These soils formed in a mantle of silty material and in the underlying material weathered from limestone. They are on the tops of ridges in the western and northern parts of the county. Slopes range from 2 to 6 percent. The soils are fine-silty, mixed, mesic Typic Hapludalfs.

Sandview soils are associated on the landscape with Faywood, Lowell, and Nicholson soils. Faywood and Lowell soils are in a fine textured family. Faywood soils are moderately deep over bedrock. Nicholson soils are moderately well drained and have a fragipan.

Typical pedon of Sandview silt loam, 2 to 6 percent slopes; about 2 miles southeast of Fairview, 0.5 mile east of the junction of Kentucky Highway 165 and Deer Lick Road, 0.4 mile northeast of Kentucky Highway 165, 40 feet northeast of a fence, in a cornfield; soil map sheet 4; about 2,099,280 feet east and 354,340 feet

north by the Kentucky coordinate grid system:

Ap—0 to 8 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; very friable; common fine roots; strongly acid; clear smooth boundary.

BE—8 to 14 inches; dark yellowish brown (10YR 4/6) silt loam; weak fine subangular blocky structure parting to weak fine granular; friable; few fine roots; few fine black concretions; medium acid; clear smooth boundary.

Bt1—14 to 26 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; firm; few fine roots; common faint clay films on faces of peds; few fine black concretions and stains; medium acid; clear smooth boundary.

Bt2—26 to 42 inches; strong brown (7.5YR 5/6) silty clay loam; common fine distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; firm; common faint clay films on faces of peds; common fine black concretions; strongly acid; clear smooth boundary.

2Bt3—42 to 49 inches; strong brown (7.5YR 5/6) silty clay; few fine distinct light yellowish brown (10YR 6/4) mottles; strong medium subangular blocky structure; very firm; many distinct clay films on faces of peds; common fine black concretions; strongly acid; clear smooth boundary.

2Bt4—49 to 58 inches; strong brown (7.5YR 5/8) clay; few fine distinct brownish yellow (10YR 5/8) mottles; strong medium subangular blocky structure; very firm; many distinct clay films on faces of peds; few fine black concretions; about 5 percent fossilized shells; strongly acid; clear smooth boundary.

2Bt5—58 to 76 inches; strong brown (7.5YR 5/8) clay; few fine distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; very firm; few faint clay films on faces of peds; common black stains and concretions; strongly acid; clear smooth boundary.

2C—76 to 98 inches; yellowish brown (10YR 5/8) clay; few fine faint pale brown mottles; massive; very firm; common fine and medium black stains; few fine black and brown concretions; strongly acid.

The thickness of the solum and the depth to limestone bedrock are more than 60 inches. Reaction ranges from very strongly acid to neutral in the upper part of the solum and from strongly acid to mildly alkaline in the lower part of the solum and in the substratum.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. The BE horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 8.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. In some pedons it is mottled in shades of brown in the lower part. The texture is silt loam or silty clay loam.

The 2Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. Some pedons are mottled in shades of brown or gray. The texture is silty clay or clay.

The 2C horizon has colors similar to those of the 2Bt horizon. It is mottled in shades of brown, gray, or olive. The texture is silty clay or clay.

Shelocta Series

The Shelocta series consists of deep or very deep, well drained soils that are moderately permeable. These soils formed in mixed colluvium derived from sandstone, siltstone, and shale. They are on side slopes, benches, foot slopes, and fans in the eastern part of the county. Slopes range from 2 to 55 percent. The soils are fine-loamy, mixed, mesic Typic Hapludults.

Shelocta soils are associated on the landscape with Berks, Brownsville, Colyer, Muse, Trappist, and Wharton soils. Berks and Brownsville soils are in a loamy-skeletal family and do not have an argillic horizon. Berks and Trappist soils are moderately deep over bedrock. Colyer soils are in a clayey-skeletal family and are shallow over black fissile shale bedrock. Muse and Trappist soils are in a clayey family and formed in material weathered from black fissile shale. Wharton soils are moderately well drained.

Typical pedon of Shelocta gravelly silt loam, 20 to 40 percent slopes; about 2 miles northeast of Muses Mills, 1 mile west of Ryan, 150 yards east of Sugar Tree Branch Road, 100 yards east of an old chimney, in an area of woodland; soil map sheet 18; about 2,214,800 feet east and 317,360 feet north by the Kentucky coordinate grid system:

- A—0 to 3 inches; dark brown (10YR 3/3) gravelly silt loam; weak fine granular structure; very friable; many fine and medium roots; about 15 percent sandstone gravel and channers; very strongly acid; clear smooth boundary.
- E—3 to 7 inches; yellowish brown (10YR 5/4) gravelly silt loam; weak fine subangular blocky structure parting to weak fine granular; very friable; many fine and medium roots; about 15 percent sandstone gravel and channers; very strongly acid; clear wavy boundary.
- Bt1—7 to 22 inches; yellowish brown (10YR 5/6) channery silt loam; moderate medium subangular blocky structure; friable; common fine and medium roots; common faint clay films on faces of peds;

about 20 percent sandstone channers; very strongly acid; clear wavy boundary.

- Bt2—22 to 35 inches; yellowish brown (10YR 5/8) very channery silt loam; moderate medium subangular blocky structure; friable; few fine and medium roots and one large root; common faint clay films on faces of peds; about 35 percent light yellowish brown (2.5Y 6/4) sandstone channers; about 1 percent shale fragments; very strongly acid; gradual wavy boundary.

- Bt3—35 to 60 inches; yellowish brown (10YR 5/6) very channery silty clay loam; few fine distinct light brownish gray (2.5Y 6/2) mottles; weak medium columnar structure parting to moderate medium angular and subangular blocky; firm; many faint clay films on faces of peds; about 50 percent light brownish gray (2.5Y 6/2), weathered sandstone channers; very strongly acid.

The thickness of the solum is 40 to 60 inches, and the depth to bedrock is more than 48 inches. Unless the soils have been limed, reaction is very strongly acid or strongly acid throughout the profile. The content of siltstone and sandstone fragments ranges from 2 to 35 percent in the A and E horizons and from 5 to 50 percent in the individual subhorizons of the Bt horizon. By weighted average, the content of rock fragments in the Bt horizon ranges from 15 to 35 percent.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4. The E horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. Some pedons are mottled in shades of brown or gray in the lower part of this horizon. The fine-earth fraction is silt loam or silty clay loam.

Some pedons have a C horizon. This horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6. In most pedons it is mottled in shades of brown, gray, or olive. The content of siltstone and sandstone fragments ranges from 15 to 70 percent. The fine-earth fraction is silt loam, silty clay loam, or loam.

Shrouts Series

The Shrouts series consists of moderately deep, well drained soils that are slowly permeable. These soils formed in residuum of calcareous shale interbedded with brown, coarse grained dolomite. They are on ridgetops and side slopes in the central and eastern parts of the county. Slopes range from 2 to 30 percent. The soils are fine, mixed, mesic Typic Hapludalfs.

Shrouts soils are associated on the landscape with Beasley, Crider, Lawrence, Muse, and Woolper soils. Crider and Lawrence soils are in a fine-silty family.

Lawrence soils are somewhat poorly drained and have a fragipan. Crider and Woolper soils are very deep over bedrock. Woolper soils have a mollic epipedon. Muse soils formed in colluvium derived from black fissile shale and are deep or very deep over bedrock.

Typical pedon of Shrouts silty clay, in an area of Beasley-Shrouts complex, rocky, 12 to 30 percent slopes, severely eroded; about 1.8 miles southeast of Beechburg, 1 mile east of Fleming Creek, 0.8 mile north of Wilson Creek, 270 yards south of Kentucky Highway 402, in a pasture; soil map sheet 6; about 2,165,520 feet east and 342,240 feet north by the Kentucky coordinate grid system:

- Ap—0 to 4 inches; very dark grayish brown (2.5Y 3/2) silty clay; strong fine and medium subangular blocky structure; firm; common fine roots; about 5 percent chert fragments; moderately alkaline; clear wavy boundary.
- Bt—4 to 7 inches; light olive brown (2.5Y 5/4) silty clay; strong medium angular blocky structure; firm; common medium roots; common distinct olive (5Y 4/3) coatings on faces of peds; strong effervescence (2 percent nodules of calcium carbonate); moderately alkaline; clear wavy boundary.
- Btk1—7 to 16 inches; light olive brown (2.5Y 5/6) clay; few fine prominent reddish yellow (7.5YR 6/8) mottles; strong medium and coarse angular blocky structure; very firm; few fine roots; common distinct olive (5Y 5/4) coatings on faces of peds; about 2 percent coarse grained dolomite fragments; strong effervescence (2 percent nodules of calcium carbonate); moderately alkaline; clear wavy boundary.
- Btk2—16 to 27 inches; olive (5Y 5/3) and greenish gray (5GY 6/1) clay; strong coarse angular blocky structure; very firm; few fine roots; many faint olive (5Y 4/3) coatings on faces of peds; about 12 percent weathered, calcareous shale fragments; strong effervescence (5 percent nodules of calcium carbonate); moderately alkaline; clear wavy boundary.
- Ck—27 to 35 inches; yellowish brown (10YR 5/8), olive (5Y 5/3), and greenish gray (5GY 6/1) channery clay; massive; few fine roots; about 34 percent calcareous shale fragments; moderately alkaline; strong effervescence (5 percent nodules of calcium carbonate); clear smooth boundary.
- Cr—35 to 40 inches; layered, calcareous shale.

The thickness of the solum is 15 to 40 inches, and the depth to paralithic contact ranges from 20 to 40 inches. Reaction ranges from strongly acid to moderately alkaline in the solum and from neutral to

moderately alkaline in the substratum. The content of chert, dolomite, limestone, and shale fragments ranges from 0 to 20 percent in the solum and from 1 to 35 percent in the Ck horizon.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 2 to 6. The fine-earth fraction is silty clay loam or silty clay.

The Bt and Btk horizons have hue of 10YR to 5GY, value of 5 or 6, and chroma of 1 to 6. The fine-earth fraction is silty clay or clay.

The Ck horizon has colors in shades of brown, yellow, olive, green, or gray. The texture is clay or channery clay.

Skidmore Series

The Skidmore series consists of deep or very deep, well drained soils that are moderately rapidly permeable. These soils formed in mixed alluvium. They are on flood plains in the eastern part of the county. Slopes range from 0 to 2 percent. The soils are loamy-skeletal, mixed, mesic Dystric Fluventic Eutrochrepts.

Skidmore soils are associated on the landscape with Melvin, Morehead, Newark, and Nolin soils, all of which are in a fine-silty family. Melvin soils are poorly drained. Morehead soils are on low stream terraces, are somewhat poorly drained or moderately well drained, and have an argillic horizon. Newark soils are somewhat poorly drained.

Typical pedon of Skidmore gravelly silt loam, occasionally flooded; about 0.8 mile west of Ryan, 0.8 mile east of the confluence of Sugar Tree Branch and Fox Creek, 200 feet southeast of Muses Mills-Ryan Road, 50 feet northwest of Fox Creek, in a hay field; soil map sheet 18; about 2,216,440 feet east and 316,160 feet north by the Kentucky coordinate grid system:

- Ap—0 to 8 inches; brown (10YR 5/3) gravelly silt loam; weak thick platy structure; friable; common fine roots; about 20 percent rounded gravel and sandstone fragments; medium acid; clear smooth boundary.
- Bw—8 to 19 inches; yellowish brown (10YR 5/4) gravelly loam; weak fine and medium subangular blocky structure; friable; common fine roots; about 30 percent rounded gravel and sandstone fragments; medium acid; clear wavy boundary.
- BC1—19 to 29 inches; brown (10YR 5/3) extremely gravelly loam; weak medium subangular blocky structure; friable; common fine roots; about 70 percent rounded gravel; medium acid; gradual wavy boundary.
- BC2—29 to 38 inches; yellowish brown (10YR 5/4) extremely gravelly loam; weak medium granular

structure; friable; about 70 percent sandstone fragments 3 to 6 inches long and about 1 inch thick; medium acid; gradual wavy boundary.

C—38 to 60 inches; yellowish brown (10YR 5/4) extremely gravelly clay loam; massive; friable; about 90 percent gravel and sandstone fragments; medium acid.

The thickness of the solum is 20 to 40 inches, and the depth to bedrock is more than 40 inches. Reaction ranges from medium acid to mildly alkaline throughout the profile. The content of gravel, siltstone, and sandstone fragments ranges from 10 to 45 percent in the Ap and Bw horizons and from 35 to 90 percent in the BC and C horizons.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4.

The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. The fine-earth fraction is loam, clay loam, fine sandy loam, or sandy loam.

The BC horizon has hue of 10YR, value of 4 to 6, and chroma of 3 to 6. The fine-earth fraction is loam, clay loam, fine sandy loam, or sandy loam.

The C horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 6. The fine-earth fraction is loam, clay loam, fine sandy loam, or sandy loam.

Tilsit Series

The Tilsit series consists of deep or very deep, moderately well drained soils that have a fragipan. These soils are moderately permeable above the fragipan and slowly permeable in the fragipan. They formed in silty material weathered from shale, siltstone, and sandstone. They are on the tops of ridges in the eastern part of the county. Slopes range from 2 to 12 percent. The soils are fine-silty, mixed, mesic Typic Fragiudults.

Tilsit soils are associated on the landscape with Blairton soils. Blairton soils are in a fine-loamy family, are moderately deep, and do not have a fragipan.

Typical pedon of Tilsit silt loam, 2 to 6 percent slopes; about 1.3 miles northeast of Muses Mills, 0.5 mile south of McRoberts Road, 200 yards northwest of the head of Weasel Hollow, in a cornfield; soil map sheet 18; about 2,210,000 feet east and 317,400 feet north by the Kentucky coordinate grid system:

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; common fine and very fine roots; common fine iron concretions; neutral; clear smooth boundary.

Bt1—8 to 18 inches; light olive brown (2.5Y 5/6) silt loam; few fine distinct pale brown (10YR 6/3) mottles in the lower 1 inch; weak fine and medium

subangular blocky structure; friable; common fine roots; common faint clay films on faces of peds; common fine iron concretions; very strongly acid; clear smooth boundary.

Bt2—18 to 25 inches; light yellowish brown (2.5Y 6/4) silt loam; common fine and medium distinct light brownish gray (10YR 6/2) and pale brown (10YR 6/3) mottles; moderate fine and medium subangular blocky structure; friable; few very fine roots; common faint clay films on faces of peds; common fine and medium iron stains; very strongly acid; abrupt wavy boundary.

Btx1—25 to 32 inches; yellowish brown (10YR 5/8) silty clay loam; many medium and coarse faint light gray (10YR 7/2), light brownish gray (10YR 6/2), and pale brown (10YR 6/3) mottles and streaks; moderate coarse prismatic structure parting to strong medium subangular blocky; very firm; brittle; few very fine roots between prisms; common faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

Btx2—32 to 49 inches; mottled light brownish gray (10YR 6/2), pale brown (10YR 6/3), and yellowish brown (10YR 5/8) silty clay loam; strong very coarse prismatic structure parting to strong medium angular blocky; very firm; brittle; many faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btx3—49 to 60 inches; yellowish brown (10YR 5/6) and light gray (10YR 7/2) silty clay loam; common medium and coarse prominent reddish brown (2.5YR 4/4) mottles; strong very coarse prismatic structure; very firm; brittle; very strongly acid.

The thickness of the solum is 40 to 60 inches, and the depth to shale, sandstone, or siltstone is more than 40 inches. Unless the soils have been limed, reaction ranges from extremely acid to strongly acid throughout the profile.

The Ap horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 2 to 4.

The Bt horizon has hue of 2.5Y or 10YR, value of 5 or 6, and chroma of 4 to 6. Some pedons are mottled in shades of brown. Some are mottled in shades of gray in the lower part of this horizon. The texture is silt loam or silty clay loam.

The Btx horizon has hue of 2.5Y to 7.5YR, value of 4 to 6, and chroma of 2 to 8. This horizon is mottled and streaked in shades of gray, brown, olive, or yellow. The texture is silt loam or silty clay loam.

Some pedons have a C horizon. This horizon has colors similar to those of the Btx horizon. The texture is silt loam, silty clay loam, or silty clay.

Trappist Series

The Trappist series consists of moderately deep, well drained soils that are slowly permeable. These soils formed in residuum and colluvium derived from black fissile shale, sandstone, and siltstone. They are on side slopes in the eastern part of the county. Slopes range from 12 to 55 percent. The soils are clayey, mixed, mesic Typic Hapludults.

Trappist soils are associated on the landscape with Berks, Brownsville, Colyer, Muse, and Shelocta soils. Berks and Brownsville soils are in a loamy-skeletal family and do not have an argillic horizon. Brownsville, Muse, and Shelocta soils are deep or very deep over bedrock. Shelocta soils are in a fine-loamy family. Colyer soils are in a clayey-skeletal family and are shallow over bedrock.

Typical pedon of Trappist silt loam, in an area of Muse-Trappist silt loams, 20 to 55 percent slopes, eroded; about 2 miles northeast of Hedger Chapel, 200 yards north of Big Run Road, 20 yards east of a small draw, in an area of woodland; soil map sheet 17; about 2,191,200 feet east and 320,000 feet north by the Kentucky coordinate grid system:

- A—0 to 2 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; friable; common fine and medium roots; about 2 percent sandstone and shale fragments; very strongly acid; clear smooth boundary.
- BE—2 to 6 inches; brown (7.5YR 5/4) silty clay loam; weak fine subangular blocky and granular structure; friable; common fine and medium roots; about 3 percent black fissile shale fragments; very strongly acid; clear wavy boundary.
- Bt1—6 to 11 inches; yellowish red (5YR 5/8) silty clay; moderate medium subangular blocky structure; firm; common fine and coarse roots; common faint clay films on faces of peds; about 5 percent black fissile shale fragments; very strongly acid; gradual smooth boundary.
- Bt2—11 to 23 inches; yellowish red (5YR 5/6) clay; common fine prominent light yellowish brown (2.5Y 6/4) and distinct red (2.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine and coarse roots; many faint clay films on faces of peds; about 10 percent black fissile shale fragments; very strongly acid; clear wavy boundary.
- Bt3—23 to 35 inches; yellowish red (5YR 5/6) channery clay; common medium prominent yellowish brown (10YR 5/6) and fine prominent red (10R 4/8) mottles; weak fine and medium subangular blocky structure; firm; few fine and medium roots; many faint yellowish red (5YR 5/8) and distinct red (2.5YR

5/8) clay films on faces of peds; about 30 percent black fissile shale fragments; very strongly acid; abrupt smooth boundary.

R—35 inches; hard, black fissile shale.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. Reaction ranges from extremely acid to strongly acid in the solum. The content of black fissile shale, siltstone, and fine grained sandstone fragments ranges from 0 to 35 percent in the solum.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 to 4.

The BE horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 4. The fine-earth fraction is silt loam or silty clay loam.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. Most pedons are mottled in shades of red or brown. This horizon is silty clay loam, silty clay, clay, or the channery analogs of those textures.

Some pedons have a C horizon. This horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 6. The content of rock fragments ranges from 25 to 75 percent. The fine-earth fraction is similar to that of the Bt horizon.

Wharton Series

The Wharton series consists of deep or very deep, moderately well drained soils that are slowly permeable or moderately slowly permeable. These soils formed in material weathered from interbedded clay shale, siltstone, and fine grained sandstone. They are on side slopes at the head of drainageways in the eastern part of the county. Slopes range from 20 to 35 percent.

Wharton soils are fine-loamy, mixed, mesic Aquic Hapludults. In most areas of this county, they differ from the typical Wharton soils because they have hue of 5Y in the lower part of the Bt horizon and in the BC horizon. This difference does not significantly affect the use, management, or behavior of the soils.

Wharton soils are associated on the landscape with Berks, Brownsville, and Shelocta soils. Berks and Brownsville soils are in a loamy-skeletal family, are well drained, and do not have an argillic horizon. Berks soils are moderately deep over bedrock. Shelocta soils are well drained.

Typical pedon of Wharton silt loam, in an area of Shelocta-Wharton complex, 20 to 55 percent slopes; about 5.5 miles north of Muses Mills, 2.5 miles northeast of a watershed structure on Anderson Branch, 230 yards south of the Lewis County line, 150 yards north of the East Prong of Anderson Branch, in an area of woodland; soil map sheet 13; about 2,212,080 feet

east and 332,200 feet north by the Kentucky coordinate grid system:

- A—0 to 5 inches; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; clear smooth boundary.
- Bt1—5 to 14 inches; yellowish brown (10YR 5/4) silt loam; moderate fine and medium subangular blocky structure; firm; common fine to coarse roots; few faint clay films on faces of peds; about 8 percent fragments of ironstone, 5 percent less than 3 inches in size; very strongly acid; clear wavy boundary.
- Bt2—14 to 19 inches; yellowish brown (10YR 5/6) silty clay loam; common fine and medium prominent light gray (5Y 6/2) and common fine and medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; common fine and medium roots; common faint clay films on faces of peds; very strongly acid; gradual wavy boundary.
- Bt3—19 to 34 inches; mottled light olive gray (5Y 6/2), light yellowish brown (2.5Y 6/4), and strong brown (7.5YR 5/8) silty clay loam; strong medium and coarse subangular and angular blocky structure; very firm; few fine roots; common faint clay films on faces of peds; about 10 percent shale fragments, which have light olive brown (2.5Y 5/4) interiors; very strongly acid; gradual wavy boundary.
- BC—34 to 41 inches; mottled pale olive (5Y 6/3), light olive gray (5Y 6/2), and yellowish brown (10YR 5/6) channery silt loam; strong medium and coarse angular blocky structure; very firm; few fine roots; about 30 percent weathered shale fragments, which have pale olive (5Y 6/4) interiors; very strongly acid; gradual wavy boundary.
- Cr—41 to 46 inches; light olive gray and yellowish brown, layered shale.

The thickness of the solum is 30 to 60 inches, and the depth to bedrock is more than 40 inches. Reaction ranges from extremely acid to strongly acid throughout the solum. The content of rock fragments ranges from 0 to 20 percent in the A and Bt horizons and from 5 to 50 percent in the BC horizon.

The A horizon has hue of 10YR, value of 3 to 6, and chroma of 2 to 4.

Some pedons have an E horizon. This horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 4. The texture is silt loam or loam.

The Bt horizon has hue of 7.5YR to 5Y, value of 5 or 6, and chroma of 2 to 8. Most pedons are mottled in shades of red, brown, or gray. This horizon is silt loam, silty clay loam, or the channery analogs of those textures.

The BC horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 2 to 8. Most pedons are mottled in shades of red, brown, olive, or gray. This horizon is silt loam, silty clay loam, silty clay, clay, or the channery or very channery analogs of those textures.

Some pedons have a C horizon. This horizon has colors and textures similar to those of the BC horizon. The content of rock fragments ranges from 20 to 90 percent.

Woolper Series

The Woolper series consists of very deep, well drained soils that are moderately slowly permeable or slowly permeable. These soils formed in colluvium or alluvium derived from soils of limestone and shale origin. They are on side slopes, foot slopes, and low stream terraces in central and western parts of the county. Slopes range from 2 to 6 percent on the low stream terraces and foot slopes and from 20 to 50 percent on the side slopes. The soils are fine, mixed, mesic Typic Argiudolls.

Woolper soils are associated on the landscape with Cynthiana, Eden, Fairmount, Faywood, and Shrouts soils on side slopes in the uplands and with Boonesboro, Newark, and Nolin soils on flood plains. Cynthiana and Fairmount soils are in a clayey family and are shallow over bedrock. Cynthiana, Eden, Faywood, Newark, Nolin, and Shrouts soils do not have a mollic epipedon. Boonesboro, Eden, Faywood, and Shrouts soils are moderately deep over bedrock. Boonesboro soils are in a fine-loamy family. Newark and Nolin soils are in a fine-silty family and do not have an argillic horizon. Newark soils are somewhat poorly drained.

Typical pedon of Woolper silt loam, 2 to 6 percent slopes, rarely flooded; about 330 yards northwest of the reservoir at Flemingsburg, 260 feet west of Kentucky Highway 11 Bypass, 160 feet north of a drainageway, in a hay field; soil map sheet 10; about 2,142,960 feet east and 339,640 feet north by the Kentucky coordinate grid system:

- Ap—0 to 9 inches; dark brown (10YR 3/3) silt loam; weak fine granular structure; friable; many fine and few medium roots; neutral; clear wavy boundary.
- A—9 to 15 inches; dark brown (10YR 3/3) silt loam; weak medium subangular blocky structure parting to weak fine granular; friable; many fine roots; few faint silt coatings on faces of peds; few fine black concretions; neutral; clear smooth boundary.
- AB—15 to 23 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine and medium subangular blocky structure parting to weak fine granular; friable;

common fine roots; few faint clay films on faces of peds; few fine black concretions; neutral; clear smooth boundary.

Bt1—23 to 28 inches; dark brown (7.5YR 4/4) silty clay loam; moderate medium and fine subangular blocky structure; firm; common fine and few medium roots; common faint clay films on faces of peds; common fine black concretions; slightly acid; clear smooth boundary.

Bt2—28 to 34 inches; dark yellowish brown (10YR 4/4) silty clay; moderate medium subangular blocky structure; firm; few fine roots; common faint clay films on faces of peds; common fine black concretions; slightly acid; clear smooth boundary.

Bt3—34 to 42 inches; dark yellowish brown (10YR 4/4) clay; common fine distinct light yellowish brown (2.5Y 6/4) mottles; strong medium subangular blocky structure; firm; few very fine roots; many faint clay films on faces of peds; many fine and medium black stains and concretions; slightly acid; clear wavy boundary.

BC—42 to 48 inches; dark yellowish brown (10YR 4/4) clay; few fine distinct light yellowish brown (2.5Y 6/4) mottles; strong medium and coarse subangular blocky structure; firm; few fine roots; common faint

clay films on faces of peds; many fine and medium black stains and concretions; slightly acid; clear wavy boundary.

C—48 to 62 inches; dark yellowish brown (10YR 4/4) clay; massive; firm; many black stains; mildly alkaline.

The thickness of the solum is 40 to 60 inches, and the depth to bedrock ranges from 60 to more than 100 inches. Reaction ranges from slightly acid to mildly alkaline throughout the profile. The content of limestone, siltstone, or shale fragments ranges from 0 to 15 percent in the solum. The mollic epipedon is 10 to 24 inches thick.

The Ap and A horizons have hue of 7.5YR or 10YR and value and chroma of 2 or 3. The AB horizon has hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 2 to 5. It is silt loam or silty clay loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4. Most pedons are mottled in shades of brown or yellow in the lower part of this horizon. The texture is silty clay loam, silty clay, or clay.

The BC and C horizons have colors similar to those of the Bt horizon. These horizons are mottled in shades of brown, gray, or olive. The texture is silty clay or clay.

Formation of the Soils

This section relates the factors and processes of soil formation to the soils in Fleming County. It also describes the physiography and geology of the county.

Factors of Soil Formation

Soil forms through the interaction of five major factors—climate, parent material, relief, plant and animal life, and time (11). Climate and plant and animal life act on the parent material. Their effects on soil formation are controlled by relief and the amount of time that they have been active. Each factor modifies the effects of the other four. The relative influence of each factor differs from place to place and determines varying characteristics of the soils.

Climate

The climate of Fleming County is humid and temperate. The average annual temperature is 54 degrees F, and the average annual precipitation is 43 inches. Because the soils in the county are not dry or frozen for long periods, the processes of soil formation are active throughout the year. Climate generally is the most important factor of soil formation. Because the climate is uniform throughout the county, however, the differences among the soils in the county are the result of other factors.

Climate affects soil formation primarily through the effects of temperature and rainfall on the chemical and physical weathering of geologic material, on erosion, and on the kind and number of plants and animals on and in the soils. As water percolates downward through the soils, it leaches soluble bases from the soils and moves particles of clay to the lower layers. Because of the translocation of these materials over a period of time, many of the soils in the county are acid, have a loamy surface layer, and have accumulated clay in the subsoil. Lowell, Sandview, and Crider soils are examples.

Parent Material

Parent material is the unconsolidated mass in which soils form. It is derived from the weathering or decomposition of bedrock. The soils in Fleming County

formed in residuum, colluvium, stream alluvium, high-level fluvial deposits, lacustrine deposits, and loess. These parent materials have weathered from the Ordovician, Silurian, Devonian, Mississippian, and Pennsylvanian geologic systems in the county or have been transported to the county from other areas by wind or water.

Many of the soils on uplands in the county formed in material weathered from limestone and shale. These include Cynthiana, Faywood, and Lowell soils. Eden soils formed in residuum of calcareous shale, siltstone, and limestone. Beasley and Shrouts soils formed in residuum of soft, calcareous shale and dolomite. Colyer and Trappist soils formed in residuum of acid, black fissile shale. Blairton soils formed in residuum of acid shale and siltstone. All of these residual soils are clayey in the subsoil and substratum.

Nicholson, Sandview, and other soils formed in a thin mantle of loess or silty material over limestone residuum. The upper part of the solum, which formed in the loess, is silty, and the lower part, which formed in the residuum, is clayey.

Brownsville, Shelocta, and other soils formed in acid colluvium derived from sandstone, siltstone, and shale on hillsides and at the base of steep slopes. These soils are loamy in the subsoil and substratum and have a high content of rock fragments.

McGary and Lawrence soils formed in silty and clayey, lacustrinelike alluvial deposits over calcareous shale. These soils generally are silty in the upper part of the subsoil and clayey in the lower part and in the substratum.

Allegheny and Monongahela soils formed in very old alluvium, or high-level fluvial deposits. Elk and Otwell formed in alluvium on stream terraces. Boonesboro, Newark, and Nolin formed in the more recent alluvium on flood plains. The alluvial soils have less clay in the subsoil and substratum than the soils that formed in residuum.

Relief and Aspect

Relief, or lay of the land, influences soil formation primarily through its effects on drainage and erosion

and through its effects on exposure to sunlight and wind and on vegetation.

In areas of moderately steep to very steep soils, such as Cynthiana, Faywood, and Eden soils, a considerable amount of water is lost through runoff and less water is able to penetrate the surface. As a result, erosion removes soil material rapidly and deep soils generally do not form. Deep and very deep soils, such as the colluvial Brownsville and Muse soils, form in areas where material moved downslope by water and gravity has accumulated. Water moves rapidly on the surface of steep and very steep soils and does not penetrate the surface. As a result, most of these soils are well drained and many have been subject to erosion.

In areas of Lowell and other gently sloping and sloping soils, enough water penetrates the surface and moves through the profile to cause leaching and a pronounced accumulation of clay in the subsoil. These soils are commonly deep and have well defined profiles. Some have a perched water table.

In areas of Newark and other nearly level soils, most of the water, excluding floodwater, drains through the profile. These soils are wet during part of the year because their landscape position does not allow the water to drain easily off the surface.

Plant and Animal Life

Plants affect soil formation primarily by adding organic matter and by acting as a major link in nutrient cycles. Burrowing animals, such as earthworms, moles, and groundhogs, mix the darker surface layer with the subsoil and add organic matter. Bacteria and fungi convert decaying plant remains into organic matter and thus release plant nutrients.

Most of the soils in Fleming County formed under hardwoods. They are characterized by a thin, dark surface layer and a brighter colored subsoil. Some soils that have a thick, dark surface layer, such as Sandview soils, probably formed under canebrakes or grasses.

Human activities have considerably altered the surface layer of the soils in the county and changed the environment. These activities include clearing forests and plowing the cleared areas, moving and mixing soil layers, adding fertilizer and lime, and introducing new plants. In some cultivated areas accelerated erosion has removed most of the original surface layer and exposed the subsoil.

Time

Time is probably the least emphasized of the five factors of soil formation. A long period of time is required for distinct soil profiles to develop. The length of time required depends mainly on the nature of the

parent material and the relief. Enough time has elapsed for the effects of the interaction of the factors of soil formation to be expressed in nearly all of the soil in Fleming County, except for the soils that formed in recent alluvium.

Immature soils show little evidence of profile development and have retained many of the characteristics of the original parent material. The immature soils in Fleming County are in areas on flood plains where a high water table and the deposition of fresh material prevent horizon development. Newark and Nolin soils are examples. Some immature soils are in areas on steep side slopes where runoff and geologic erosion prevent profile development. Berks and Brownsville soils are examples.

Mature soils have well developed profiles. Crider and Lowell soils are examples. They generally are on relatively stable surfaces and are deep or very deep over bedrock. Weathering has translocated minerals and the finer textured material into the subsoil and has resulted in the development of well defined horizons.

Processes of Horizon Differentiation

The formation of a succession of layers, or horizons, in a soil is the result of one or more of the following processes—the accumulation of organic matter, the leaching of carbonates and other soluble minerals, the chemical weathering of primary minerals into silicate clay minerals, the translocation of the silicate clays and probably some silt-sized particles from one horizon to another, and the reduction and translocation of iron.

Several of these processes have been active in the formation of most of the soils in Fleming County. The interaction of the first four processes is reflected in the strongly expressed horizons in Crider and Sandview soils. All five processes have probably been active in the formation of the moderately well drained Monongahela, Nicholson, Otwell, and Tilsit soils.

Some organic matter has accumulated in all of the soils in the county, forming the surface layer, or A1 horizon. Most of the soils have a moderate content of organic matter in the surface layer. If tilled, the A1 horizon becomes part of the Ap horizon.

Most of the soils in the county are acid in the upper layer, even the soils that formed in nonacid material. Carbonates and other soluble materials have been partially leached into the lower layers or out of the profile. Beasley and Lowell are examples of soils in which this process occurs.

The translocation of clay minerals is an important process in many of the soils in the county. As clay minerals are removed from the A horizon, they accumulate as clay films on the faces of peds, in pores, and in root channels in the B horizon.

A fragipan has formed in the B horizon of some of the moderately well drained and somewhat poorly drained soils on uplands and terraces. The fragipan is a dense, compact layer that is hard or very hard when dry, is brittle when moist, is slowly permeable or very slowly permeable, and has few to many bleached fracture planes that form polygons.

Gleying, or the reduction and transfer of iron, has occurred in all of the soils that are not characterized by good natural drainage. Gleyed soils are gray and mottled. Part of the iron may have been reoxidized and segregated, forming yellowish brown, strong brown, and other brightly colored mottles in an essentially gray matrix in the subsoil. Nodules or concretions of iron or manganese oxide commonly form under these conditions.

As silicate clay forms from primary minerals, some iron is commonly freed as hydrated oxides. These oxides are generally red. Even if they occur in small amounts, they give a brownish color to the soil material. They are largely responsible for the strong brown, yellowish brown, or reddish brown colors that dominate the subsoil of many soils in Fleming County.

Physiography and Geology

Beecher J. Hines, geologist, Soil Conservation Service, helped prepare this section.

Fleming County is in three physiographic regions—the Hills of the Bluegrass, the Outer Bluegrass, and the Mountains and Eastern Coalfields (4). The Hills of the Bluegrass region covers the western part of the county. The Outer Bluegrass region covers the northern, central, and southern parts. It is the largest of the three regions in the county. The eastern part of the county is in the Mountains and Eastern Coalfields region.

Fleming County has a diversity of geologic material. A variety of soils formed in material weathered from the diverse rock formations. The major geologic strata underlying the soils in the county are of the Paleozoic era (33, 34, 35, 36, 37, 38, 39). These strata were deposited in shallow seas 280 to 500 million years ago. The sedimentary rocks on uplands are of the Ordovician, Silurian, Devonian, Mississippian, and Pennsylvanian Systems. Some of the tops of ridges on uplands in the southern part of the county have a thin mantle of loamy and gravelly sediments of the Quaternary and Tertiary Systems. The valleys consist of alluvial material of the Quaternary System. Table 20 shows the relationship of the geologic systems, formations, and members to the dominant soils in the county.

The Lee Formation of the Pennsylvanian System crops out in very small areas on three of the highest

summits at the Fleming-Rowan county line (37). This formation consists of sandstone and conglomerate. Elevations range from about 1,380 to 1,430 feet. The dominant soils are those of the Berks series.

The Mississippian System, excluding the Sunbury Formation, is made of the Borden Formation, which in turn is made up of the Cowbell, Nancy, and Farmers Members (33, 34, 37). This system and its members form the knobs and ridgetops and most of the highest peaks in the eastern part of the county.

The Cowbell Member consists of siltstone and silty shale. It weathered to form the peaks, narrow ridgetops, and moderately long side slopes at the highest elevations in the county. Elevations range from about 1,100 to 1,400 feet at the Fleming-Rowan county line. The soils are moderately deep to very deep and have a very strongly acid or strongly acid, loamy subsoil in which the content of rock fragments is high. Berks and Brownsville are the dominant soils.

The Nancy Member consists of layered shale, siltstone, and sandstone. As it weathered, it formed moderately broad and broad ridgetops and short upper side slopes. Elevations range from about 960 feet in the southern part of the county to about 1,300 feet at the Fleming-Lewis county line to the north. Generally, the soils are moderately deep to very deep and have an extremely acid to strongly acid, loamy subsoil. Blairton, Shelocta, Tilsit, and Wharton are the dominant soils.

The Farmers Member consists of sandstone and minor amounts of shale. As it weathered, it formed the short upper side slopes and narrow, rocky ridgetops of the knobs and uplands at the contact point with the Devonian System. Elevations range from about 960 to 1,200 feet. Generally, the soils are moderately deep to very deep, have large amounts of rock fragments, have thin ledges of sandstone rock outcrop, and have a strongly acid or very strongly acid, loamy subsoil. Berks, Brownsville, and Shelocta are the dominant soils.

The Devonian and Lower Mississippian Systems form the side slopes of the uplands in the eastern part of the county (33, 37). The geological weathering of these systems produces conical formations, or knobs, from which the Knobs physiographic region derives its name. The Knobs region is very narrow in this county and is included with the Mountains and Eastern Coalfields region. These systems consist of layered, black fissile shale of the Sunbury Formation; layered, green shale and siltstone of the Bedford Formation; and black fissile shale of the Ohio Formation (fig. 15). These formations weathered to form moderately long side slopes and short foot slopes. Elevations range from about 800 feet in the southern part of the county to about 1,100 feet in the northern part. The soils are shallow to very deep



Figure 15.—Layered, black fissile shale of the Devonian System underlies Muse, Trappist, and Colyer soils.

and have a strongly acid to extremely acid, clayey subsoil. Colyer, Trappist, and Muse are the dominant soils.

The Silurian System is in the Outer Bluegrass physiographic region. It covers the central part of the county, extending from north to south (33, 35, 36, 37, 38). It also underlies the stream terraces and flood

plains in the Fox Valley and is exposed along most of the lower slopes. This system consists of interbedded, calcareous shale and dolomitic limestone of the Bisher Limestone Formation, the Upper Crab Orchard Formation, the Lower Crab Orchard Formation, and the Brassfield Formation.

The Bisher Limestone Formation is dolomitic

limestone at the contact of the Silurian System with the Devonian System. Elevations range from about 860 to 940 feet. This formation is inconsistent and generally is covered by Devonian colluvium or occurs only as a thin exposure of rock outcrop.

The Upper Crab Orchard Formation is dominated by calcareous shale. As it weathered, it formed broad, nearly level ridgetops and short side slopes. Elevations

range from about 700 feet in the southern part of the county to about 980 feet in the northern part. Generally, the soils on ridgetops are moderately deep to very deep, and the soils on side slopes are moderately deep. Most of the soils have a very strongly acid to moderately alkaline, clayey subsoil. Shrouts and Beasley are the dominant soils.

In the Wallingford, Beechburg, and Pleasureville



Figure 16.—Dolomite outcrop of the Lower Crab Orchard and Brassfield Formations in an area of Beasley-Shrouts complex, 12 to 30 percent slopes, severely eroded.



Figure 17.—Layered Ordovician limestone of the Bull Fork Formation on a creek bottom.

areas of Fleming County, the broad, nearly level ridgetops have a silty and clayey, lacustrinelike mantle over the clayey, calcareous shale of the Upper Crab Orchard Formation. The soils are deep or very deep. They generally are silty in the upper part of the subsoil and clayey in the lower part. The subsoil becomes more alkaline with increasing depth. Lawrence, McGary, and Nicholson are the dominant soils.

The Lower Crab Orchard Formation consists of interbedded, dolomitic limestone and calcareous shale (fig. 16). As it weathered, it formed moderately broad and broad, rolling ridgetops and short upper side slopes. Elevations range from about 670 feet in the southern part of the county to about 940 feet in the northern part. The soils are deep or very deep and have a very strongly acid to moderately alkaline, clayey or loamy subsoil. Beasley, Crider, Nicholson, and Sandview are the dominant soils.

The Ordovician System is the most extensive of the systems in the county. It covers the western half of the county, or about 60 percent of the land area in the county (35, 36, 39). It is in the Hills of the Bluegrass and Outer Bluegrass regions. This system consists of interbedded, dolomitic limestone and calcareous shale of the Preachersville Member of the Drakes Formation and the interbedded limestone, siltstone, and shale of the Bull Fork, Grant Lake, Fairview, Kope, Clays Ferry, and Tanglewood Formations. As these formations weathered, they formed narrow or broad, rolling ridgetops and short or long side slopes. Elevations range from about 600 feet in the western part of the county to about 920 feet in the northern part. Generally, the soils on side slopes are shallow to very deep, and the soils on ridgetops are moderately deep to very deep. Most of the soils have a very strongly acid to moderately alkaline, clayey subsoil. The parent material of Eden soils is derived from the interbedded shale, limestone, and siltstone of the Kope, Clays Ferry, and Tanglewood Formations. Cynthiana, Fairmount,

Faywood, Lowell, and Woolper soils formed in material weathered from interbedded limestone and shale of the Bull Fork, Grant Lake, and Fairview Formations (fig. 17). In some areas Beasley and Shrouts soils formed in material weathered from the Preachersville Member of the Drakes Formation.

In some areas the ridgetops have a mantle of silty material. The upper 30 inches of the soils formed in the silty material, and the lower part formed in clayey material weathered from the underlying formations. Most of these soils have a very strongly acid to mildly alkaline, loamy subsoil. Nicholson and Sandview are the dominant soils.

The Quaternary System consists of alluvial deposits on flood plains and stream terraces in areas of the various rivers, creeks, and watersheds in the county. The largest areas of these deposits are along the Licking River, along the North Fork of the Licking River, and in the Fox Creek watershed. The soils have a very strongly acid to moderately alkaline, loamy or clayey subsoil. Elk and Otwell are the dominant soils on stream terraces. Boonesboro, Newark, Nolin, Skidmore, and Woolper are the dominant soils on flood plains.

The Quaternary and Tertiary Systems are of limited extent in the county. They are along the tops of ridges on uplands above the Licking River in the southern part of the county (38, 39). They are in the Hills of the Bluegrass and Outer Bluegrass regions and are the remnant deposits of ancestral stream terraces and flood plains. These systems are made up of abundant quartz pebbles, less abundant limestone and chert pebbles, and less common fragments of sandstone, siltstone, chert, and quartz-pebble conglomerate in a matrix of sandy silt. As these materials weathered, they formed rolling ridgetops at elevations of about 620 to 840 feet. The soils are very deep and have an extremely acid to slightly acid, loamy subsoil. Allegheny, Elk, and Monongahela are the dominant soils.

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Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Aspect. The direction in which a slope faces. On a warm aspect, slopes of more than 15 percent face an azimuth of 135 to 315 degrees. On a cool aspect, slopes of more than 15 percent face an azimuth of 315 to 135 degrees.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as:

Very low.....	less than 2.4
Low.....	2.4 to 3.2
Moderate.....	3.2 to 5.2
High.....	more than 5.2

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Chert. An impure, very fine grained siliceous rock frequently associated with limestone, dolomite, and conglomerate.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and

proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conglomerate. A coarse grained clastic rock made up of rounded to subangular rock fragments, commonly with a matrix of sand and finer textured material. Cementing agents include silica, calcium carbonate, and iron oxide.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of

regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Devonian period. The fourth period of the Paleozoic era of geologic time, extending from the end of the Silurian period (about 405 million years ago) to the beginning of the Mississippian period (about 345 million years ago).

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Dolomite. Sedimentary rock that is made up chiefly of calcium and magnesium carbonate in the form of the mineral dolomite.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:
Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant

periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after

a soaking rain; also called *normal field capacity*, *normal moisture capacity*, or *capillary capacity*.

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Fissile. The quality of any rock that permits its distinct separation into parallel laminae, or layers, as in shale.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 37.5 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the substratum below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser

depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:
O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting

runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Knob. A low, rounded hill rising above the adjacent landforms. A knob in Kentucky commonly has shale as the major rock on its side slopes.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landform. Any physical, recognizable form or feature on the earth's surface having a characteristic shape and produced by natural causes. Examples of major landforms are plains, hills, and valleys.

Landscape (geology). The distinct associations of landforms, especially as modified by geologic forces, that can be seen in a single view.

Large stones (in tables). Rock fragments that are 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Limestone. A sedimentary rock consisting chiefly of calcium carbonate, primarily in the form of calcite. Limestone generally forms through a combination of organic and inorganic processes and includes soluble and insoluble constituents. Many kinds of limestone contain fossils.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Mississippian period. The fifth period of the Paleozoic era of geologic time, extending from the end of the Devonian period (about 345 million years ago) to the beginning of the Pennsylvanian period (about 310 million years ago).

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Ordovician period. The second period of the Paleozoic era of geologic time, extending from the end of the Cambrian period (about 500 million years ago) to the beginning of the Silurian period (about 425 million years ago).

Organic matter. Plant and animal residue in the soil in various stages of decomposition. Terms used in this survey to describe organic matter content are:

Low	less than 2 percent
Moderate	2 to 4 percent
High	more than 4 percent

Paleozoic era. The geologic era between the Precambrian and Mesozoic eras, characterized by the development of the first fishes, amphibians, reptiles, and land plants. It was the period between 600 million years and 230 million years ago.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan*, *fragipan*, *claypan*, *plowpan*, and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Pennsylvanian period. The sixth period of the Paleozoic era of geologic time, extending from the end of the Mississippian period (about 300 million years ago) to the beginning of the Permian period (about 270 million years ago) and characterized by warm climates and swampy areas.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Perennial stream. A creek or stream in which water flows throughout the year.

Permeability. The quality of the soil that enables water

to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Quaternary period. The second period of the Cenozoic era of geologic time, extending from the end of the Tertiary period (about 1 million years ago) to the present.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Silurian period. The third period of the Paleozoic era of geologic time, extending from the end of the Ordovician period (about 425 million years ago) to the beginning of the Devonian period (about 405 million years ago).

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. Terms used in this survey to describe slopes are:

Nearly level	0 to 2 percent
Gently sloping	2 to 6 percent
Sloping	6 to 12 percent
Moderately steep	12 to 20 percent
Steep	20 to 30 percent
Very steep	30 to 60 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent

material, as conditioned by relief over periods of time.

Soil depth. The depth of the soil over bedrock. Terms used in this survey to describe soil depth are:

Very shallow	less than 10 inches deep
Shallow	10 to 20 inches deep
Moderately deep	20 to 40 inches deep
Deep	40 to 60 inches deep
Very deep	more than 60 inches deep

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the substratum. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stratified. Arranged in layers (strata). The term refers to geologic material. Soil layers that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest,

during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Tertiary period. The first period of the Cenozoic era of geologic time, following the Mesozoic era and preceding the Quaternary period (from approximately 63 million to 1 million years ago).

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt loam*, *silt*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be

further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited in stream valleys by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors that are assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. This contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an oven-dry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION
(Recorded in the period 1951-78 at Flemingsburg, Kentucky)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have--		Average number of growing degree days*	Average	2 years in 10 will have--		Average number of days with 0.10 inch or more	Average snowfall
				Maximum	Minimum			Less	More		
				temperature higher than--	temperature lower than--			than--	than--		
	° F	° F	° F	° F	° F	Units	In	In	In		In
January-----	39.8	21.3	30.6	69	-14	19	3.09	1.80	4.20	6	4.3
February-----	43.7	23.6	33.7	72	-7	17	2.55	1.32	3.60	6	2.9
March-----	54.3	33.0	43.7	81	8	82	4.32	2.38	6.25	9	2.0
April-----	66.8	42.9	54.9	85	22	172	3.91	1.79	5.65	8	.1
May-----	74.9	51.5	63.2	89	28	415	4.31	2.44	5.84	8	.0
June-----	81.8	59.3	70.6	93	42	618	3.82	2.72	4.86	8	.0
July-----	84.7	63.3	74.0	95	49	744	4.84	3.05	6.50	8	.0
August-----	84.1	62.0	73.1	94	48	716	3.91	2.45	5.51	6	.0
September---	78.5	56.1	67.3	92	36	519	3.26	1.49	4.78	6	.0
October-----	67.4	44.2	55.8	85	23	213	2.35	1.08	3.41	5	.0
November-----	54.9	35.1	45.0	77	10	31	3.07	1.57	4.25	7	.7
December-----	44.3	26.4	35.4	70	-2	20	3.22	1.57	4.48	6	.9
Yearly:											
Average----	64.6	43.2	53.9	---	---	---	---	---	---	---	---
Extreme----	---	---	---	97	-14	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,566	42.65	36.16	47.87	83	10.9

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL
(Recorded in the period 1951-78 at Flemingsburg, Kentucky)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 16	Apr. 26	May 15
2 years in 10 later than--	Apr. 10	Apr. 20	May 9
5 years in 10 later than--	Mar. 30	Apr. 10	Apr. 29
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 20	Oct. 13	Oct. 3
2 years in 10 earlier than--	Oct. 26	Oct. 17	Oct. 7
5 years in 10 earlier than--	Nov. 7	Oct. 25	Oct. 14

TABLE 3.--GROWING SEASON
(Recorded in the period 1951-78 at Flemingsburg,
Kentucky)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	<u>Days</u>	<u>Days</u>	<u>Days</u>
9 years in 10	194	175	147
8 years in 10	203	183	154
5 years in 10	221	198	168
2 years in 10	238	213	181
1 year in 10	247	221	188

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AgB	Allegheny fine sandy loam, 2 to 6 percent slopes-----	1,305	0.6
AgC2	Allegheny fine sandy loam, 6 to 12 percent slopes, eroded-----	1,798	0.8
AgD	Allegheny fine sandy loam, 12 to 20 percent slopes-----	1,123	0.5
BaB	Beasley silt loam, 2 to 6 percent slopes-----	5,964	2.7
BeC2	Beasley silty clay loam, 6 to 12 percent slopes, eroded-----	12,085	5.4
BhE3	Beasley-Shrouts complex, rocky, 12 to 30 percent slopes, severely eroded-----	14,843	6.6
BkF2	Berks-Brownsville complex, 30 to 60 percent slopes, eroded-----	2,084	0.9
BrB	Blairton silt loam, 2 to 6 percent slopes-----	331	0.1
BrC2	Blairton silt loam, 6 to 12 percent slopes, eroded-----	3,815	1.7
BrE2	Blairton silt loam, 12 to 30 percent slopes, eroded-----	3,870	1.7
Bs	Boonesboro silt loam, frequently flooded-----	2,044	0.9
BwF2	Brownsville-Berks complex, very rocky, 20 to 55 percent slopes, eroded-----	11,499	5.1
CoF2	Colyer-Trappist complex, 12 to 55 percent slopes, eroded-----	878	0.4
CrB	Crider silt loam, 2 to 6 percent slopes-----	2,427	1.1
CrC	Crider silt loam, 6 to 12 percent slopes-----	563	0.3
CyC2	Cynthiana-Faywood complex, 6 to 12 percent slopes, eroded-----	2,887	1.3
CyE2	Cynthiana-Faywood complex, very rocky, 12 to 35 percent slopes, eroded-----	22,170	9.9
EdD2	Eden silty clay loam, 6 to 20 percent slopes, eroded-----	3,664	1.6
EfE2	Eden flaggy silty clay loam, 20 to 35 percent slopes, eroded-----	18,422	8.2
EkB	Elk silt loam, 2 to 6 percent slopes-----	1,739	0.8
EkC	Elk silt loam, 6 to 12 percent slopes-----	492	0.2
FaF	Fairmount-Woolper complex, very rocky, 20 to 60 percent slopes-----	4,154	1.9
FwB	Faywood silt loam, 2 to 6 percent slopes-----	2,099	0.9
FyC2	Faywood-Lowell silt loams, 6 to 12 percent slopes, eroded-----	13,028	5.8
FyD2	Faywood-Lowell silt loams, 12 to 20 percent slopes, eroded-----	7,631	3.4
La	Lawrence silt loam-----	1,679	0.7
LoB	Lowell silt loam, 2 to 6 percent slopes-----	10,054	4.5
LoC	Lowell silt loam, 6 to 12 percent slopes-----	9,925	4.4
LoD2	Lowell silt loam, 12 to 20 percent slopes, eroded-----	658	0.3
Ma	McGary silt loam-----	850	0.4
Me	Melvin silt loam, frequently flooded-----	504	0.2
MgB	Monongahela loam, 2 to 6 percent slopes-----	1,092	0.5
MgC	Monongahela loam, 6 to 12 percent slopes-----	232	0.1
Mo	Morehead silt loam, rarely flooded-----	856	0.4
MsB2	Muse channery silt loam, 2 to 6 percent slopes, eroded-----	497	0.2
MsC2	Muse channery silt loam, 6 to 12 percent slopes, eroded-----	1,571	0.7
MsD2	Muse channery silt loam, 12 to 20 percent slopes, eroded-----	2,768	1.2
MtD3	Muse-Shrouts complex, 6 to 20 percent slopes, severely eroded-----	4,084	1.8
MuF2	Muse-Trappist silt loams, 20 to 55 percent slopes, eroded-----	18,179	8.1
Ne	Newark silt loam, occasionally flooded-----	2,752	1.2
NhB	Nicholson silt loam, 2 to 6 percent slopes-----	3,007	1.3
NhC	Nicholson silt loam, 6 to 12 percent slopes-----	413	0.2
No	Nolin silt loam, occasionally flooded-----	6,542	2.9
OtB	Otwell silt loam, 2 to 6 percent slopes-----	1,694	0.8
OtC	Otwell silt loam, 6 to 12 percent slopes-----	273	0.1
Pt	Pits, quarries-----	224	0.1
SaB	Sandview silt loam, 2 to 6 percent slopes-----	374	0.2
ShC	Shelocta gravelly silt loam, 4 to 12 percent slopes-----	230	0.1
ShD	Shelocta gravelly silt loam, 12 to 20 percent slopes-----	329	0.1
ShF	Shelocta gravelly silt loam, 20 to 40 percent slopes-----	466	0.2
SrF	Shelocta-Wharton complex, 20 to 55 percent slopes-----	1,573	0.7
SsB	Shrouts silty clay loam, 2 to 6 percent slopes-----	788	0.4
StC3	Shrouts silty clay, 6 to 12 percent slopes, severely eroded-----	3,789	1.7
StD3	Shrouts silty clay, 12 to 20 percent slopes, severely eroded-----	1,368	0.6
Sx	Skidmore gravelly silt loam, occasionally flooded-----	2,043	0.9
TsB	Tilsit silt loam, 2 to 6 percent slopes-----	2,765	1.2
TsC	Tilsit silt loam, 6 to 12 percent slopes-----	425	0.2
WoB	Woolper silt loam, 2 to 6 percent slopes, rarely flooded-----	1,381	0.6
	Water areas less than 40 acres in size-----	193	0.1
	Water areas more than 40 acres in size-----	128	0.1
	Total-----	224,621	100.0

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Tobacco	Soybeans	Wheat	Grass-legume hay	Pasture	Alfalfa hay
		Bu	Lb	Bu	Bu	Ton	AUM*	Ton
AgB----- Allegheny	IIe	115	3,000	40	45	4.0	7.5	4.5
AgC2----- Allegheny	IIIe	105	2,400	30	40	3.5	7.0	4.0
AgD----- Allegheny	IVe	90	2,200	25	35	3.0	6.0	3.5
BaB----- Beasley	IIe	105	2,800	35	40	3.5	8.0	4.5
BeC2----- Beasley	IIIe	90	2,400	25	30	3.0	6.0	3.5
BhE3**----- Beasley-Shrouts	VIIe	---	---	---	---	---	3.0	---
BkF2**----- Berks- Brownsville	VIIe	---	---	---	---	---	---	---
BrB----- Blairton	IIe	95	2,500	30	35	3.5	7.0	4.0
BrC2----- Blairton	IIIe	85	2,200	25	30	3.0	6.0	3.5
BrE2----- Blairton	VIe	---	---	---	---	---	5.5	---
Bs----- Boonesboro	IIw	100	2,800	35	35	3.0	6.0	3.5
BwF2**----- Brownsville- Berks	VIIe	---	---	---	---	---	---	---
CoF2**----- Colyer-Trappist	VIIe	---	---	---	---	---	---	---
CrB----- Crider	IIe	135	3,500	45	50	5.0	9.0	5.5
CrC----- Crider	IIIe	120	3,200	40	45	4.5	8.5	5.0
CyC2**----- Cynthiana- Faywood	IVe	65	---	---	25	2.5	4.5	3.0
CyE2**----- Cynthiana- Faywood	VIIs	---	---	---	---	---	3.5	---
EdD2----- Eden	IVe	65	---	---	20	2.5	5.0	3.0

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Tobacco	Soybeans	Wheat	Grass- legume hay	Pasture	Alfalfa hay
		Bu	Lb	Bu	Bu	Ton	AUM*	Ton
EfE2----- Eden	VIe	---	---	---	---	---	3.5	---
EkB----- Elk	IIe	130	3,400	45	50	5.0	9.0	5.5
EkC----- Elk	IIIe	115	3,000	40	45	4.0	8.0	5.0
FaF**----- Fairmount- Woolper	VIIe	---	---	---	---	---	---	---
FwB----- Faywood	IIe	100	2,500	30	40	3.5	7.0	4.0
FyC2**----- Faywood-Lowell	IIIe	85	2,200	25	35	3.0	6.5	3.5
FyD2**----- Faywood-Lowell	IVe	70	2,000	---	25	2.5	5.5	3.0
La----- Lawrence	IIIw	80	---	35	---	3.0	6.0	---
LoB----- Lowell	IIe	115	3,000	35	45	4.0	8.0	4.5
LoC----- Lowell	IIIe	100	2,700	30	40	3.5	7.5	4.0
LoD2----- Lowell	IVe	80	2,100	25	30	3.0	5.5	3.5
Ma----- McGary	IIIw	80	---	30	---	3.0	6.0	---
Me----- Melvin	IIIw	80	---	35	---	3.5	7.0	---
MgB----- Monongahela	IIe	105	2,700	40	40	3.5	7.5	---
MgC----- Monongahela	IIIe	90	2,500	30	35	3.0	6.5	---
Mo----- Morehead	IIw	110	2,500	40	40	4.0	8.0	---
MsB2----- Muse	IIe	100	2,600	35	45	4.0	7.0	4.5
MsC2----- Muse	IIIe	90	2,300	30	40	3.5	6.0	4.0
MsD2----- Muse	IVe	80	2,000	---	35	3.0	6.0	3.5
MtD3----- Muse-Shrouts	VIe	---	---	---	---	2.5	4.5	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Tobacco	Soybeans	Wheat	Grass- legume hay	Pasture	Alfalfa hay
		<u>Bu</u>	<u>Lb</u>	<u>Bu</u>	<u>Bu</u>	<u>Ton</u>	<u>AUM*</u>	<u>Ton</u>
MuF2**----- Muse-Trappist	VIIe	---	---	---	---	---	---	---
Ne----- Newark	IIw	110	2,500	40	45	4.5	8.5	---
NhB----- Nicholson	IIe	125	3,000	40	40	4.0	8.5	---
NhC----- Nicholson	IIIe	110	2,700	35	35	3.5	7.5	---
No----- Nolin	IIw	125	3,000	40	40	4.0	9.0	4.5
OtB----- Otwell	IIe	105	2,700	35	40	4.0	8.0	---
OtC----- Otwell	IIIe	95	2,400	30	35	3.5	7.0	---
Pt**----- Pits, quarries	VIIIIs	---	---	---	---	---	---	---
SaB----- Sandview	IIe	135	3,500	45	50	5.0	9.0	5.5
ShC----- Shelocta	IIIe	95	2,300	30	40	4.0	7.0	4.5
ShD----- Shelocta	IVe	80	2,000	---	35	3.5	6.0	4.0
ShF----- Shelocta	VIIe	---	---	---	---	---	---	---
SrF**----- Shelocta- Wharton	VIIe	---	---	---	---	---	---	---
SsB----- Shrouts	IIe	90	2,300	30	35	3.5	6.0	4.0
StC3----- Shrouts	IVe	---	---	---	---	---	4.0	---
StD3----- Shrouts	VIe	---	---	---	---	---	3.5	---
Sx----- Skidmore	IIw	80	2,500	30	30	3.0	5.5	3.0
TsB----- Tilsit	IIe	105	2,500	35	40	3.5	7.5	---
TsC----- Tilsit	IIIe	90	2,200	25	35	3.0	6.5	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Tobacco	Soybeans	Wheat	Grass- legume hay	Pasture	Alfalfa hay
		<u>Bu</u>	<u>Lb</u>	<u>Bu</u>	<u>Bu</u>	<u>Ton</u>	<u>AUM*</u>	<u>Ton</u>
WoB----- Woolper	Ile	115	2,900	40	45	4.0	8.0	4.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

(Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		<u>Acres</u>	<u>Acres</u>	<u>Acres</u>
I	---	---	---	---
II	49,754	35,517	14,237	---
III	47,883	44,850	3,033	---
IV	22,849	22,849	---	---
V	---	---	---	---
VI	49,914	27,744	---	22,170
VII	53,676	53,676	---	---
VIII	224	---	---	224

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
AgB, AgC2----- Allegheny	Slight	Moderate	Slight	Severe	Shortleaf pine----- Yellow-poplar----- Virginia pine----- Sugar maple----- White ash----- Northern red oak----- American elm----- Red maple----- Pignut hickory----- Black oak----- White oak----- Eastern redcedar----- Black cherry-----	80 93 72 --- --- --- --- --- --- 78 70 --- ---	130 95 112 --- --- --- --- --- --- 60 52 --- ---	Eastern white pine, yellow-poplar, black walnut, shortleaf pine, white oak, white ash, northern red oak.
AgD----- Allegheny	Moderate	Moderate	Slight	Severe	Shortleaf pine----- Yellow-poplar----- Virginia pine----- Sugar maple----- White ash----- Northern red oak----- American elm----- Red maple----- Pignut hickory----- Black oak----- White oak----- Eastern redcedar----- Black cherry-----	80 93 72 --- --- --- --- --- --- 78 70 --- ---	130 95 112 --- --- --- --- --- --- 60 52 --- ---	Eastern white pine, yellow-poplar, black walnut, shortleaf pine, white oak, white ash, northern red oak.
BaB, BeC2----- Beasley	Moderate	Moderate	Slight	Severe	White oak----- Scarlet oak----- Eastern redcedar----- Chinkapin oak----- Hickory----- White ash----- Black locust-----	65 --- 41 58 --- 63 ---	47 --- 44 41 --- --- ---	White oak, eastern redcedar, Virginia pine, white ash.
BhE3**: Beasley-----	Moderate	Moderate	Moderate	Moderate	White oak----- Scarlet oak----- Eastern redcedar----- Chinkapin oak----- Hickory----- White ash-----	50 --- --- --- --- ---	34 --- --- --- --- ---	Virginia pine, eastern redcedar, white ash.
Shrouds-----	Severe	Moderate	Severe	Slight	Virginia pine----- Eastern redcedar----- Scarlet oak----- White oak----- Black oak-----	50 40 50 --- ---	68 43 34 --- ---	Virginia pine, eastern redcedar, white oak.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
BkF2**:								
Berks----- (warm aspect)	Moderate	Severe	Severe	Moderate	Scarlet oak----- Black oak----- Virginia pine----- Chestnut oak----- Shortleaf pine----- White oak-----	58 71 63 --- --- 63	41 53 73 --- --- 46	Virginia pine, shortleaf pine, white oak.
Brownsville----- (warm aspect)	Severe	Severe	Moderate	Moderate	White oak----- Black oak----- Chestnut oak----- Shortleaf pine-----	69 --- 68 ---	51 --- 50 ---	Eastern white pine, white oak, shortleaf pine.
BkF2**:								
Berks----- (cool aspect)	Moderate	Severe	Slight	Moderate	Scarlet oak----- Black oak----- Virginia pine----- White oak----- Hickory----- Yellow-poplar----- Red maple-----	75 80 58 70 --- 98 ---	57 62 86 52 --- 104 ---	Yellow-poplar, shortleaf pine, white oak, northern red oak, eastern white pine.
Brownsville----- (cool aspect)	Severe	Severe	Slight	Moderate	White oak----- Yellow-poplar----- Scarlet oak----- Shortleaf pine----- Black oak----- Hickory----- Red maple-----	74 85 78 63 --- --- ---	56 81 60 95 --- --- ---	Eastern white pine, shortleaf pine, yellow- poplar, white ash, white oak.
BrB, BrC2----- Blairton	Slight	Slight	Slight	Severe	White oak----- Black oak----- Shortleaf pine----- Scarlet oak----- Chestnut oak----- Hickory----- Virginia pine-----	66 66 69 60 67 --- 60	48 48 108 52 49 --- 91	White oak, northern red oak, eastern white pine, shortleaf pine.
BrE2----- Blairton	Moderate	Moderate	Slight	Severe	White oak----- Black oak----- Shortleaf pine----- Chestnut oak----- Scarlet oak----- Hickory----- Virginia pine-----	66 66 69 67 70 --- 60	48 48 108 49 52 --- 91	White oak, northern red oak, eastern white pine, shortleaf pine.
Bs----- Boonesboro	Slight	Slight	Moderate	Severe	Yellow-poplar----- White ash----- Sweetgum----- American elm----- Hackberry----- American sycamore-----	90 --- --- --- --- ---	90 --- --- --- --- ---	Eastern cottonwood, sweetgum, yellow-poplar, white ash.
BwF2**:								
Brownsville----- (warm aspect)	Severe	Severe	Moderate	Moderate	White oak----- Black oak----- Chestnut oak----- Shortleaf pine-----	69 --- 68 ---	51 --- 50 ---	Eastern white pine, white oak, shortleaf pine.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
BwF2**:								
Berks----- (warm aspect)	Moderate	Severe	Moderate	Moderate	Scarlet oak----- Black oak----- Virginia pine----- Chestnut oak----- Shortleaf pine----- White oak-----	58 71 63 --- --- 63	41 53 73 --- --- 46	Virginia pine, shortleaf pine, white oak.
BwF2**:								
Brownsville---- (cool aspect)	Severe	Severe	Moderate	Moderate	White oak----- Yellow-poplar----- Scarlet oak----- Shortleaf pine----- Black oak----- Hickory----- Red maple-----	74 85 78 63 --- --- ---	56 81 60 95 --- --- ---	Eastern white pine, shortleaf pine, yellow- poplar, white ash, white oak.
Berks----- (cool aspect)	Moderate	Severe	Moderate	Moderate	Scarlet oak----- Black oak----- Virginia pine----- White oak----- Hickory----- Yellow-poplar----- Red maple-----	75 80 58 70 --- 98 ---	57 62 86 52 --- 104 ---	Virginia pine, eastern white pine, northern red oak, yellow-poplar, shortleaf pine, white oak, red oak.
CoF2**:								
Colyer----- (warm aspect)	Severe	Severe	Severe	Slight	Virginia pine----- Chestnut oak----- Scarlet oak----- White oak----- Shortleaf pine----- Pitch pine-----	52 51 53 52 50 48	73 35 37 36 68 ---	Virginia pine, shortleaf pine.
Trappist----- (warm aspect)	Moderate	Moderate	Slight	Moderate	Virginia pine----- White oak----- Hickory----- Black oak----- Red maple----- Eastern redcedar----- Chestnut oak----- Scarlet oak-----	62 60 --- 62 --- --- 58 ---	95 43 --- 45 --- --- 41 ---	Virginia pine, white oak.
CoF2**:								
Colyer----- (cool aspect)	Severe	Severe	Moderate	Slight	Virginia pine----- Chestnut oak----- Scarlet oak----- Black oak----- Hickory-----	60 65 56 66 ---	91 47 39 48 ---	Virginia pine, shortleaf pine.
Trappist----- (cool aspect)	Moderate	Moderate	Slight	Moderate	Virginia pine----- White oak----- Hickory----- Black oak----- Red maple----- Eastern redcedar----- Chestnut oak----- Scarlet oak----- American beech----- Northern red oak-----	62 60 --- 62 --- --- 58 --- --- ---	95 43 --- 45 --- --- 41 --- --- ---	Virginia pine, white oak.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Plant competi- tion	Common trees	Site index	Volume*	
CrB, CrC----- Crider	Slight	Slight	Slight	Severe	Yellow-poplar-----	97	102	Eastern white pine, yellow- poplar, black walnut, loblolly pine, white ash, northern red oak, white oak, shortleaf pine.
					Sugar maple-----	---	---	
					Black oak-----	84	66	
					White ash-----	87	---	
					Black walnut-----	80	---	
					White oak-----	72	54	
					Hickory-----	---	---	
CyC2**: Cynthiana-----	Slight	Moderate	Moderate	Moderate	Northern red oak----	84	66	
					Eastern redcedar----	42	46	
					American elm-----	---	---	
					Honeylocust-----	---	---	
					Chinkapin oak-----	---	---	
					Hackberry-----	---	---	
					Black walnut-----	71	---	
					White ash-----	75	---	
					Black locust-----	---	---	
Faywood-----	Slight	Moderate	Slight	Moderate	Black cherry-----	---	---	
					Boxelder-----	---	---	
					Northern red oak----	70	52	
					Scarlet oak-----	72	54	
					White oak-----	60	43	
					Hickory-----	---	---	
					White ash-----	---	---	
					Chinkapin oak-----	---	---	
CyE2**: Cynthiana-----	Moderate	Moderate	Moderate	Moderate	Sugar maple-----	---	---	
					Southern red oak----	---	---	
					Eastern redcedar----	42	46	
					American elm-----	---	---	
					Honeylocust-----	---	---	
					Chinkapin oak-----	---	---	
					Hackberry-----	---	---	
					Black walnut-----	71	---	
					White ash-----	75	---	
					Black locust-----	---	---	
Faywood-----	Moderate	Moderate	Slight	Moderate	Black cherry-----	---	---	
					Boxelder-----	---	---	
					Northern red oak----	70	52	
					Scarlet oak-----	72	54	
					White oak-----	60	43	
					Hickory-----	---	---	
					White ash-----	---	---	
					Chinkapin oak-----	---	---	
					Sugar maple-----	---	---	
					Southern red oak----	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
EdD2, Efe2----- Eden	Severe	Moderate	Moderate	Moderate	Eastern redcedar----	41	44	White oak, white ash, eastern white pine.
					Black oak-----	69	51	
					White oak-----	---	---	
					White ash-----	60	---	
					Scarlet oak-----	70	52	
					Black walnut-----	74	---	
					Hickory-----	---	---	
EkB, EkC----- Elk	Slight	Slight	Slight	Severe	Chinkapin oak-----	78	60	Eastern white pine, yellow-poplar, black walnut, white oak, northern red oak, white ash, shortleaf pine.
					Yellow-poplar-----	94	92	
					Pin oak-----	96	93	
					Hackberry-----	---	---	
					Red maple-----	---	---	
					American sycamore---	---	---	
					Black walnut-----	---	---	
FaF**: Fairmount-----	Severe	Severe	Severe	Moderate	Black oak-----	65	47	White oak, Virginia pine, white ash.
					Eastern redcedar----	41	44	
					Scarlet oak-----	---	---	
					Chinkapin oak-----	55	38	
					Hickory-----	---	---	
Woolper-----	Severe	Severe	Moderate	Severe	Black locust-----	---	---	Yellow-poplar, white ash, white oak, northern red oak, eastern white pine.
					Black oak-----	75	57	
					Chinkapin oak-----	71	53	
					White ash-----	---	---	
					Hickory-----	---	---	
					Sugar maple-----	---	---	
					White oak-----	---	---	
FwB----- Faywood	Slight	Moderate	Slight	Moderate	Yellow buckeye-----	---	---	White oak, eastern white pine, white ash, northern red oak.
					Black walnut-----	---	---	
					Northern red oak----	70	52	
					Scarlet oak-----	72	54	
					White oak-----	60	43	
					Hickory-----	---	---	
					White ash-----	---	---	
FyC2**: Faywood-----	Slight	Moderate	Slight	Moderate	Chinkapin oak-----	---	---	White oak, eastern white pine, white ash, northern red oak.
					Sugar maple-----	---	---	
					Southern red oak----	---	---	
					Northern red oak----	70	52	
					Scarlet oak-----	72	54	
					White oak-----	60	43	
					Hickory-----	---	---	
					White ash-----	---	---	
					Chinkapin oak-----	---	---	
					Sugar maple-----	---	---	
					Southern red oak----	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Plant competi- tion	Common trees	Site index	Volume*	
FyC2**: Lowell-----	Slight	Slight	Slight	Severe	Black oak----- White ash----- Hickory----- Virginia pine----- Black locust----- Sugar maple----- Northern red oak----- Chinkapin oak-----	88 78 --- 78 74 --- --- 81	70 --- --- 119 --- --- --- 63	White ash, eastern white pine, white oak, northern red oak, yellow-poplar.
FyD2**: Faywood-----	Moderate	Moderate	Slight	Moderate	Northern red oak----- Scarlet oak----- White oak----- Hickory----- White ash----- Chinkapin oak----- Sugar maple----- Southern red oak-----	70 72 60 --- --- --- --- ---	52 54 43 --- --- --- --- ---	White oak, eastern white pine, white ash, northern red oak.
Lowell-----	Moderate	Moderate	Slight	Severe	Black oak----- White ash----- Hickory----- Virginia pine----- Black locust----- Sugar maple----- Northern red oak----- Chinkapin oak-----	88 78 --- 78 77 --- --- 81	70 --- --- 119 --- --- --- 63	White ash, eastern white pine, white oak, northern red oak, yellow-poplar.
La----- Lawrence	Slight	Moderate	Moderate	Severe	Yellow-poplar----- Sweetgum----- White oak----- Black oak----- Red maple----- Pin oak----- Hackberry-----	85 89 74 78 --- --- ---	81 103 56 60 --- --- ---	Yellow-poplar, white ash, American sycamore, white oak, sweetgum, eastern white pine.
LoB, LoC----- Lowell	Slight	Slight	Slight	Severe	Black oak----- White ash----- Hickory----- Virginia pine----- Black locust----- Sugar maple----- Northern red oak----- Chinkapin oak-----	88 78 --- 78 74 --- --- 81	70 --- --- 119 --- --- --- 63	White ash, eastern white pine, white oak, northern red oak, yellow-poplar.
LoD2----- Lowell	Moderate	Moderate	Slight	Severe	Black oak----- White ash----- Hickory----- Virginia pine----- Black locust----- Sugar maple----- Northern red oak----- Chinkapin oak-----	88 78 --- 78 77 --- --- 81	70 --- --- 119 --- --- --- 63	White ash, eastern white pine, white oak, northern red oak, yellow-poplar.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
Ma----- McGary	Slight	Moderate	Slight	Severe	Pin oak----- Sweetgum----- Hickory----- Red maple----- Hackberry----- Green ash----- Post oak-----	80 --- --- --- --- --- 66	74 --- --- --- --- --- 48	Eastern white pine, American sycamore, pin oak, green ash.
Me----- Melvin	Slight	Moderate	Moderate	Severe	Pin oak----- Sweetgum----- Green ash----- Hackberry----- Hickory----- Red maple----- Black willow----- American sycamore---	100 92 --- --- --- --- --- ---	78 95 --- --- --- --- --- ---	Pin oak, American sycamore, sweetgum, loblolly pine, eastern cottonwood.
MgB, MgC----- Monongahela	Slight	Slight	Slight	Severe	Northern red oak--- Yellow-poplar----- Eastern white pine-- Virginia pine----- White ash----- Black walnut-----	70 85 72 66 --- ---	52 81 126 102 --- ---	Eastern white pine, white oak, yellow-poplar, shortleaf pine, northern red oak.
Mo----- Morehead	Slight	Moderate	Moderate	Severe	Yellow-poplar----- White oak----- Red maple----- Pin oak----- Black oak----- Shortleaf pine-----	82 --- --- --- --- 84	75 --- --- --- --- 138	Shortleaf pine, yellow-poplar, sweetgum, pin oak, eastern white pine, green ash.
MsB2, MsC2----- Muse	Slight	Slight	Slight	Severe	White oak----- Shortleaf pine----- Virginia pine----- Red maple----- Yellow-poplar----- Black oak-----	62 81 64 --- 110 58	49 132 98 --- 124 41	Shortleaf pine, white oak, eastern white pine, yellow-poplar, northern red oak.
MsD2----- Muse	Moderate	Moderate	Slight	Severe	White oak----- Shortleaf pine----- Virginia pine----- Red maple----- Yellow-poplar----- Black oak----- Scarlet oak----- Hickory-----	62 81 64 --- 110 58 --- ---	45 132 98 --- 124 41 --- ---	Shortleaf pine, white oak, eastern white pine, yellow-poplar.
MtD3**: Muse-----	Moderate	Moderate	Moderate	Severe	White oak----- Black oak----- Scarlet oak----- Shortleaf pine----- Virginia pine-----	62 58 --- 81 64	45 41 --- 132 99	Shortleaf pine, loblolly pine, Virginia pine, eastern white pine.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Volume*	
MtD3**: Shrouds-----	Moderate	Moderate	Severe	Slight	Virginia pine----- Eastern redcedar---- Scarlet oak----- White oak----- Black oak-----	60 45 60 --- ---	91 52 43 --- ---	Virginia pine, white oak.
MuF2**: Muse-----	Severe	Severe	Slight	Severe	White oak----- Shortleaf pine----- Virginia pine----- White oak----- Red maple----- Yellow-poplar----- Black oak-----	62 81 64 62 --- 110 58	45 132 48 45 --- 126 41	Shortleaf pine, white oak, eastern white pine, yellow- poplar.
Trappist-----	Severe	Severe	Slight	Moderate	Virginia pine----- White oak----- Hickory----- Black oak----- Red maple----- Eastern redcedar---- Chestnut oak----- Scarlet oak-----	62 60 --- 68 --- --- 58 ---	95 43 --- 45 --- --- 41 ---	Virginia pine, white oak.
Ne----- Newark	Slight	Moderate	Moderate	Severe	Pin oak----- Eastern cottonwood-- Sweetgum----- Green ash-----	100 94 85 ---	98 113 93 ---	Eastern cottonwood, sweetgum, American sycamore, green ash.
NhB, NhC----- Nicholson	Moderate	Slight	Slight	Severe	Black oak----- White oak----- Hickory----- Sweetgum----- Yellow-poplar----- Northern red oak----	78 74 --- 84 107 79	60 56 --- 90 119 61	White oak, northern red oak, sweetgum, yellow-poplar, eastern white pine, white ash.
No----- Nolin	Slight	Slight	Moderate	Severe	Yellow-poplar----- Sweetgum----- Eastern cottonwood-- Black walnut----- American sycamore---	107 92 --- --- ---	119 112 --- --- ---	Yellow-poplar, eastern white pine, eastern cottonwood, white ash, sweetgum, black walnut.
OtB, OtC----- Otwell	Slight	Slight	Slight	Severe	Yellow-poplar----- White oak----- Sugar maple----- Black oak----- Blackgum-----	95 69 --- 72 ---	98 51 --- 54 ---	Eastern white pine, yellow- poplar, white ash, white oak.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			
	Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Plant competi- tion	Common trees	Site index	Volume*	Trees to plant
SaB----- Sandview	Slight	Slight	Slight	Severe	Northern red oak----	80	62	Black walnut,
					White oak-----	75	57	northern red
					Bur oak-----	---	---	oak, white
					White ash-----	80	---	oak, white
					Hickory-----	---	---	ash, yellow-
					Black walnut-----	---	---	poplar,
					Black cherry-----	---	---	eastern white
					Black locust-----	---	---	pine,
					Hackberry-----	---	---	shortleaf
ShC----- Shelocta	Slight	Slight	Slight	Severe	American elm-----	---	---	pine.
					White oak-----	79	61	Yellow-poplar,
					Yellow-poplar-----	102	110	black walnut,
					Cucumber tree-----	---	---	eastern white
					American beech-----	---	---	pine,
					Shortleaf pine-----	77	124	shortleaf
					Red maple-----	81	---	pine, white
					Black oak-----	79	61	ash, white
					Hickory-----	---	---	oak, northern
ShD----- Shelocta (warm aspect)	Moderate	Moderate	Moderate	Severe	red oak.			
					White oak-----	65	47	Shortleaf pine,
					Black oak-----	70	52	white oak,
					Scarlet oak-----	68	50	eastern white
					Yellow-poplar-----	92	93	pine.
					American beech-----	---	---	
					Blackgum-----	---	---	
					Red maple-----	---	---	
					Chestnut oak-----	68	50	
ShD----- Shelocta (cool aspect)	Moderate	Moderate	Slight	Severe				
					White oak-----	79	61	Yellow-poplar,
					Yellow-poplar-----	102	110	black walnut,
					Cucumber tree-----	---	---	eastern white
					American beech-----	---	---	pine,
					Shortleaf pine-----	77	124	shortleaf
					Red maple-----	81	---	pine, white
					Black oak-----	79	61	ash, white
					Hickory-----	---	---	oak, northern
ShF----- Shelocta (warm aspect)	Severe	Severe	Moderate	Severe	red oak.			
					White oak-----	65	47	Shortleaf pine,
					Black oak-----	70	52	white oak,
					Scarlet oak-----	68	50	eastern white
					Yellow-poplar-----	92	93	pine.
					American beech-----	---	---	
					Blackgum-----	---	---	
					Red maple-----	---	---	
					Chestnut oak-----	68	50	
ShF----- Shelocta (cool aspect)	Severe	Severe	Slight	Severe				
					White oak-----	79	61	Yellow-poplar,
					Yellow-poplar-----	102	110	black walnut,
					Cucumber tree-----	---	---	eastern white
					American beech-----	---	---	pine,
					Shortleaf pine-----	77	124	shortleaf
					Red maple-----	---	---	pine, white
					Black oak-----	79	61	ash, white
					Hickory-----	---	---	oak, northern
					red oak.			

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Plant competi- tion	Common trees	Site index	Volume*	
SrF**:								
Shelocta----- (warm aspect)	Severe	Severe	Moderate	Severe	Black oak----- White oak----- Scarlet oak----- Yellow-poplar----- American beech----- Blackgum----- Red maple----- Chestnut oak-----	70 65 68 --- --- --- --- 68	52 47 50 --- --- --- --- 50	Shortleaf pine, white oak, eastern white pine.
Wharton----- (warm aspect)	Severe	Severe	Moderate	Severe	Black oak----- White oak----- Hickory-----	70 --- ---	52 --- ---	White oak, shortleaf pine.
SrF**:								
Shelocta----- (cool aspect)	Severe	Severe	Slight	Severe	White oak----- Yellow-poplar----- Cucumber tree----- American beech----- Shortleaf pine----- Red maple----- Black oak-----	79 102 --- --- 77 --- 79	61 110 --- --- 124 --- 61	Yellow-poplar, black walnut, eastern white pine, shortleaf pine, white ash, white oak, northern red oak.
Wharton----- (cool aspect)	Severe	Severe	Slight	Severe	Northern red oak---- Yellow-poplar----- White oak----- Hickory-----	76 90 --- ---	58 90 --- ---	Eastern white pine, yellow- poplar, northern red oak, white oak, shortleaf pine.
SsB----- Shrouts	Slight	Moderate	Moderate	Moderate	Virginia pine----- Scarlet oak----- Black oak----- Eastern redcedar---- White oak-----	60 60 60 45 ---	91 43 43 52 ---	Virginia pine, white oak.
StC3----- Shrouts	Moderate	Moderate	Severe	Slight	Virginia pine----- Eastern redcedar---- Scarlet oak----- White oak----- Black oak-----	50 40 50 --- ---	68 43 34 --- ---	Virginia pine, eastern redcedar.
StD3----- Shrouts	Moderate	Moderate	Severe	Slight	Virginia pine----- Eastern redcedar---- Scarlet oak----- White oak----- Black oak-----	50 40 50 --- ---	68 43 34 --- ---	Virginia pine, eastern redcedar.
Sx----- Skidmore	Slight	Slight	Moderate	Severe	Yellow-poplar----- Sweetgum----- American sycamore---- River birch----- Blackgum----- White oak----- Black oak-----	103 --- --- --- --- --- ---	112 --- --- --- --- --- ---	Yellow-poplar, white ash, eastern white pine, American sycamore, white oak, sweetgum.

See footnotes at end of table.

TABLE 7 --WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Plant competi- tion	Common trees	Site index	Volume*	
TsB, TsC----- Tilsit	Slight	Slight	Slight	Severe	Shortleaf pine-----	72	114	Eastern white pine, shortleaf pine, white oak, yellow- poplar.
					White oak-----	68	50	
					Yellow-poplar-----	92	93	
					Black oak-----	74	56	
					Virginia pine-----	73	113	
					Scarlet oak-----	74	56	
					Hickory-----	---	---	
					Red maple-----	---	---	
WoB----- Woolper	Slight	Moderate	Moderate	Severe	Southern red oak----	65	47	Yellow-poplar, white ash, white oak, northern red oak, eastern white pine.
					Black oak-----	75	57	
					Chinkapin oak-----	71	53	
					White ash-----	---	---	
					Hickory-----	---	---	
					Sugar maple-----	---	---	
					White oak-----	---	---	
					Yellow buckeye-----	---	---	
					Black walnut-----	---	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AgB----- Allegheny	Slight-----	Slight-----	Moderate: slope, small stones.	Slight-----	Slight.
AgC2----- Allegheny	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: slope.
AgD----- Allegheny	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
BaB----- Beasley	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: percs slowly, slope.	Slight-----	Slight.
BeC2----- Beasley	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight-----	Moderate: slope.
BhE3*: Beasley-----	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Shrouds-----	Severe: slope, percs slowly, too clayey.	Severe: slope, too clayey, percs slowly.	Severe: slope, too clayey, percs slowly.	Severe: too clayey.	Severe: slope, too clayey.
BkF2*: Berks-----	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.	Severe: slope.	Severe: slope, small stones.
Brownsville-----	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
BrB----- Blairton	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones.	Severe: erodes easily.	Moderate: depth to rock.
BrC2----- Blairton	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: depth to rock, slope.
BrE2----- Blairton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Bs----- Boonesboro	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
BwF2*: Brownsville-----	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BwF2*: Berks-----	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.	Severe: slope.	Severe: slope, small stones.
CoF2*: Colyer-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: droughty, slope, depth to rock.
Trappist-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
CrB----- Crider	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
CrC----- Crider	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: slope.
CyC2*: Cynthiana-----	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones.	Severe: erodes easily.	Severe: depth to rock.
Faywood-----	Moderate: percs slowly, slope.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, depth to rock.
CyE2*: Cynthiana-----	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: erodes easily.	Severe: slope, depth to rock.
Faywood-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Edd2----- Eden	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: large stones, slope.
Efe2----- Eden	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: large stones, slope.
EkB----- Elk	Slight-----	Slight-----	Moderate: slope.	Severe: erodes easily.	Slight.
EkC----- Elk	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
FaF*: Fairmount-----	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: large stones, slope, small stones.	Severe: erodes easily, slope.	Severe: large stones, slope, depth to rock.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
FaF*: Woolper-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
FwB----- Faywood	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: depth to rock, slope, percs slowly.	Moderate: dusty.	Moderate: depth to rock.
FyC2*: Faywood-----	Moderate: percs slowly, slope.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, depth to rock.
Lowell-----	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
FyD2*: Faywood-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Lowell-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
La----- Lawrence	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Severe: erodes easily.	Moderate: wetness.
LoB----- Lowell	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight-----	Slight.
LoC----- Lowell	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
LoD2----- Lowell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Ma----- McGary	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Me----- Melvin	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
MgB----- Monongahela	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones.	Severe: erodes easily.	Slight.
MgC----- Monongahela	Moderate: wetness, slope.	Moderate: slope, wetness.	Slope-----	Severe: erodes easily.	Moderate: slope.
Mo----- Morehead	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
MsB2----- Muse	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: small stones.	Severe: erodes easily.	Moderate: small stones.
MsC2----- Muse	Moderate: slope, small stones, percs slowly.	Moderate: slope, small stones, percs slowly.	Severe: slope, small stones.	Severe: erodes easily.	Moderate: small stones, slope.
MsD2----- Muse	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: erodes easily.	Severe: slope.
MtD3*: Muse-----	Moderate: slope, small stones, percs slowly.	Moderate: slope, small stones, percs slowly.	Severe: slope, small stones.	Severe: erodes easily.	Moderate: small stones, slope.
Shrouts-----	Severe: percs slowly, too clayey.	Severe: too clayey, percs slowly.	Severe: slope, too clayey, percs slowly.	Severe: too clayey.	Severe: too clayey.
MuF2*: Muse-----	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope, erodes easily.	Severe: slope.
Trappist-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Ne----- Newark	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
NhB----- Nicholson	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness.
NhC----- Nicholson	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
No----- Nolin	Severe: flooding.	Slight-----	Slight-----	Severe: erodes easily.	Moderate: flooding.
OtB----- Otwell	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight-----	Slight.
OtC----- Otwell	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope.
Pt* Pits, quarries					

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
SaB----- Sandview	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
ShC----- Shelocta	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight-----	Moderate: small stones, slope.
ShD----- Shelocta	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
ShF----- Shelocta	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
SrF*: Shelocta-----	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Wharton-----	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
SsB----- Shrouts	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight-----	Moderate: depth to rock.
StC3----- Shrouts	Severe: percs slowly, too clayey.	Severe: too clayey, percs slowly.	Severe: slope, too clayey, percs slowly.	Severe: too clayey.	Severe: too clayey.
StD3----- Shrouts	Severe: slope, percs slowly, too clayey.	Severe: slope, too clayey, percs slowly.	Severe: slope, too clayey, percs slowly.	Severe: too clayey.	Severe: slope, too clayey.
Sx----- Skidmore	Severe: flooding, small stones.	Severe: small stones.	Severe: small stones.	Slight-----	Severe: small stones.
TsB----- Tilsit	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
TsC----- Tilsit	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, wetness.
WoB----- Woolper	Severe: flooding.	Moderate: percs slowly.	Moderate: percs slowly, slope.	Severe: erodes easily.	Slight.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AgB----- Allegheny	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AgC2----- Allegheny	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AgD----- Allegheny	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BaB----- Beasley	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BeC2----- Beasley	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BhE3*: Beasley-----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Shrouts-----	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
BkF2*: Berks-----	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Brownsville-----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
BrB----- Blairton	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BrC2----- Blairton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BrE2----- Blairton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Bs----- Boonesboro	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BwF2*: Brownsville-----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Berks-----	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
CoF2*: Colyer-----	very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Trappist-----	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
CrB----- Crider	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CrC----- Crider	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CyC2*: Cynthiana-----	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Faywood-----	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CyE2*: Cynthiana-----	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Faywood-----	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
EdD2----- Eden	Fair	Good	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
EfE2----- Eden	Very poor.	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
EkB----- Elk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EkC----- Elk	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FaF*: Fairmount-----	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Woolper-----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
FwB----- Faywood	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
FyC2*: Faywood-----	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Lowell-----	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FyD2*: Faywood-----	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Lowell-----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
La----- Lawrence	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
LoB----- Lowell	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LoC----- Lowell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LoD2----- Lowell	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ma----- McGary	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Me----- Melvin	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
MgB----- Monongahela	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MgC----- Monongahela	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Mo----- Morehead	Fair	Good	Good	Good	---	Fair	Poor	Good	Good	Poor.
MsB2----- Muse	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MsC2----- Muse	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MsD2----- Muse	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MtD3*: Muse-----	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Shrouts-----	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
MuF2*: Muse-----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Trappist-----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Ne----- Newark	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
NhB----- Nicholson	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NhC----- Nicholson	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
No----- Nolin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
OtB----- Otwell	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
OtC----- Otwell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Pt*. Pits, quarries										
SaB----- Sandview	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ShC----- Shelocta	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ShD----- Shelocta	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ShF----- Shelocta	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
SrF*: Shelocta-----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Wharton-----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
SsB----- Shrouts	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
StC3, StD3----- Shrouts	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Sx----- Skidmore	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
TsB----- Tilsit	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TsC----- Tilsit	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WoB----- Woolper	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AgB----- Allegheny	Slight-----	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
AgC2----- Allegheny	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
AgD----- Allegheny	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BaB----- Beasley	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
BeC2----- Beasley	Moderate: slope, too clayey.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
BhE3*: Beasley-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
Shrouds-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope, too clayey.
BkF2*: Berks-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
Brownsville-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
BrB----- Blairton	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength.	Moderate: depth to rock.
BrC2----- Blairton	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: low strength, slope.	Moderate: depth to rock, slope.
BrE2----- Blairton	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Bs----- Boonesboro	Severe: depth to rock.	Severe: flooding.	Severe: flooding, depth to rock.	Severe: flooding.	Severe: flooding.	Severe: flooding.
BwF2*: Brownsville-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
BwF2*: Berks-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
CoF2*: Colyer-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, low strength, slope.	Severe: droughty, slope, depth to rock.
Trappist-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
CrB----- Crider	Moderate: too clayey.	Slight-----	Slight-----	Moderate: slope.	Severe: low strength.	Slight.
CrC----- Crider	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
CyC2*: Cynthiana-----	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, low strength.	Severe: depth to rock.
Faywood-----	Severe: depth to rock.	Moderate: slope, depth to rock, shrink-swell.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
CyE2*: Cynthiana-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, low strength, slope.	Severe: slope, depth to rock.
Faywood-----	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
Edd2----- Eden	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope, large stones.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: large stones, slope, depth to rock.
EfE2----- Eden	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: large stones, slope.
EkB----- Elk	Moderate: too clayey.	Slight-----	Slight-----	Moderate: slope.	Severe: low strength.	Slight.
EkC----- Elk	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
FaF*: Fairmount-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, low strength, slope.	Severe: large stones, slope, depth to rock.
Woolper-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
FwB----- Faywood	Severe: depth to rock.	Moderate: depth to rock, shrink-swell.	Severe: depth to rock.	Moderate: slope, depth to rock, shrink-swell.	Severe: low strength.	Moderate: depth to rock.
FyC2*: Faywood-----	Severe: depth to rock.	Moderate: slope, depth to rock, shrink-swell.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
Lowell-----	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
FyD2*: Faywood-----	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
Lowell-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
La----- Lawrence	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
LoB----- Lowell	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
LoC----- Lowell	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
LoD2----- Lowell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Ma----- McGary	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
Me----- Melvin	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
MgB----- Monongahela	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.	Slight.
MgC----- Monongahela	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: slope, low strength, wetness.	Moderate: slope.
Mo----- Morehead	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
MsB2----- Muse	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: small stones.
MsC2----- Muse	Moderate: too clayey, wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope.
MsD2----- Muse	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
MtD3*: Muse-----	Moderate: too clayey, wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope.
Shrouds-----	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Severe: too clayey.
MuF2*: Muse-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Trappist-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Ne----- Newark	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
NhB----- Nicholson	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength.	Moderate: wetness.
NhC----- Nicholson	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: wetness, slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
No----- Nolin	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
OtB----- Otwell	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Slight.
OtC----- Otwell	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: slope.
Pt*. Pits, quarries						
SaB----- Sandview	Moderate: too clayey.	Slight-----	Moderate: shrink-swell.	Moderate: slope.	Moderate: low strength.	Slight.
ShC----- Shelocta	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, slope.
ShD, ShF----- Shelocta	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
SrF*: Shelocta-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wharton-----	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
SsB----- Shrouts	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: depth to rock.
StC3----- Shrouts	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Severe: too clayey.
StD3----- Shrouts	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope, too clayey.
Sx----- Skidmore	Moderate: depth to rock, wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: small stones.
TsB----- Tilsit	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Severe: low strength.	Moderate: wetness.
TsC----- Tilsit	Severe: wetness.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: slope, wetness.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
WoB----- Woolper	Moderate: too clayey.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Slight.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AgB----- Allegheny	Slight-----	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.
AgC2----- Allegheny	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
AgD----- Allegheny	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
BaB----- Beasley	Severe: percs slowly.	Moderate: slope, depth to rock.	Severe: too clayey, depth to rock.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
BeC2----- Beasley	Severe: percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope, depth to rock.	Poor: too clayey, hard to pack.
BhE3*: Beasley-----	Severe: slope, percs slowly.	Severe: slope.	Severe: slope, too clayey, depth to rock.	Severe: slope.	Poor: slope, too clayey, hard to pack.
Shrouts-----	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
BkF2*: Berks-----	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope, depth to rock.	Poor: small stones, slope, depth to rock.
Brownsville-----	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
BrB----- Blairton	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
BrC2----- Blairton	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope, wetness.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
BrE2----- Blairton	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Bs----- Boonesboro	Severe: flooding, depth to rock, poor filter.	Severe: seepage, depth to rock, flooding.	Severe: flooding, depth to rock, seepage.	Severe: flooding, depth to rock, seepage.	Poor: depth to rock.
BwF2*: Brownsville-----	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Berks-----	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope, depth to rock.	Poor: small stones, slope, depth to rock.
CoF2*: Colyer-----	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey, slope.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, slope.
Trappist-----	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
CrB----- Crider	Slight-----	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.
CrC----- Crider	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
CyC2*: Cynthiana-----	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
Faywood-----	Severe: depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
CyE2*: Cynthiana-----	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, slope, too clayey.
Faywood-----	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: slope, depth to rock, too clayey.	Severe: slope, depth to rock.	Poor: depth to rock, too clayey, hard to pack.
Edd2----- Eden	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
EfE2----- Eden	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, slope.
EkB----- Elk	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.
EkC----- Elk	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
FaF*: Fairmount-----	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, slope.
Woolper-----	Severe: slope, percs slowly.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope, too clayey, hard to pack.
FwB----- Faywood	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
FyC2*: Faywood-----	Severe: depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
Lowell-----	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
FyD2*: Faywood-----	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: slope, depth to rock, too clayey.	Severe: slope, depth to rock.	Poor: depth to rock, too clayey, hard to pack.
Lowell-----	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
La----- Lawrence	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
LoB----- Lowell	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
LoC----- Lowell	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
LoD2----- Lowell	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Ma----- McGary	Severe: wetness, percs slowly.	Moderate: depth to rock.	Severe: wetness, too clayey, depth to rock.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Me----- Melvin	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
MgB----- Monongahela	Severe: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
MgC----- Monongahela	Severe: percs slowly, wetness.	Severe: slope, wetness.	Moderate: slope, wetness.	Moderate: slope, wetness.	Fair: small stones, wetness, slope.
Mo----- Morehead	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
MsB2----- Muse	Severe: percs slowly.	Moderate: depth to rock, slope, wetness.	Severe: depth to rock, wetness.	Moderate: depth to rock, wetness.	Poor: too clayey, hard to pack.
MsC2----- Muse	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, wetness.	Moderate: depth to rock, wetness, slope.	Poor: too clayey, hard to pack.
MsD2----- Muse	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, wetness, slope.	Severe: slope.	Poor: too clayey, hard to pack, slope.
MtD3*: Muse-----	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, wetness.	Moderate: depth to rock, wetness, slope.	Poor: too clayey, hard to pack.
Shrouds-----	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
MuF2*: Muse-----	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, wetness, slope.	Severe: slope.	Poor: too clayey, hard to pack, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MuF2*: Trappist-----	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
Ne----- Newark	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
NhB----- Nicholson	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
NhC----- Nicholson	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness, too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
No----- Nolin	Severe: flooding, wetness.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
OtB----- Otwell	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
OtC----- Otwell	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness, slope, too clayey.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
Pt*. Pits, quarries					
SaB----- Sandview	Severe: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight-----	Poor: too clayey.
ShC----- Shelocta	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, depth to rock.	Moderate: slope.	Poor: small stones.
ShD, ShF----- Shelocta	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, depth to rock.	Severe: slope.	Poor: small stones, slope.
SrF*: Shelocta-----	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, depth to rock.	Severe: slope.	Poor: small stones, slope.
Wharton-----	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: slope, wetness, depth to rock.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SsB----- Shrouts	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
StC3----- Shrouts	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
StD3----- Shrouts	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
Sx----- Skidmore	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, depth to rock, seepage.	Severe: flooding, seepage, wetness.	Poor: seepage, small stones.
TsB----- Tilsit	Severe: percs slowly, wetness.	Severe: wetness.	Severe: depth to rock, wetness.	Moderate: wetness, depth to rock.	Fair: wetness, too clayey.
TsC----- Tilsit	Severe: percs slowly, wetness.	Severe: slope, wetness.	Severe: depth to rock, wetness.	Moderate: slope, wetness, depth to rock.	Fair: slope, too clayey, wetness.
WoB----- Woolper	Severe: percs slowly.	Severe: flooding.	Severe: too clayey.	Moderate: flooding.	Poor: too clayey, hard to pack.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AgB----- Allegheny	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
AgC2----- Allegheny	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
AgD----- Allegheny	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
BaB, BeC2----- Beasley	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
BhE3*: Beasley-----	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
Shrouts-----	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
BkF2*: Berks-----	Poor: slope, depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Brownsville-----	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
BrB, BrC2----- Blairton	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
BrE2----- Blairton	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Bs----- Boonesboro	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
BwF2*: Brownsville-----	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Berks-----	Poor: slope, depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CoF2*: Colyer-----	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, depth to rock, too clayey.
Trappist-----	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
CrB----- Crider	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
CrC----- Crider	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
CyC2*: Cynthiana-----	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, too clayey.
Faywood-----	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CyE2*: Cynthiana-----	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Faywood-----	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
EdD2----- Eden	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey.
EfE2----- Eden	Poor: depth to rock, slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
EkB----- Elk	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
EkC----- Elk	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
FaF*: Fairmount-----	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey, large stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
FaF*: Woolper-----	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
FwB----- Faywood	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
FyC2*: Faywood-----	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Lowell-----	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
FyD2*: Faywood-----	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
Lowell-----	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
La----- Lawrence	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
LoB, LoC----- Lowell	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
LoD2----- Lowell	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
Ma----- McGary	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Me----- Melvin	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
MgB----- Monongahela	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
MgC----- Monongahela	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones.
Mo----- Morehead	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
MsB2, MsC2----- Muse	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
MsD2----- Muse	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
MtD3*: Muse-----	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Shrouds-----	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
MuF2*: Muse-----	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Trappist-----	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
Ne----- Newark	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
NhB----- Nicholson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
NhC----- Nicholson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
No----- Nolin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
OtB----- Otwell	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
OtC----- Otwell	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
Pt*. Pits, quarries				
SaB----- Sandview	Moderate: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
ShC----- Shelocta	Good-----	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
ShD----- Shelocta	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
ShF----- Shelocta	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
SrF*: Shelocta-----	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Wharton-----	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
SsB, StC3----- Shrouts	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
StD3----- Shrouts	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
Sx----- Skidmore	Fair: large stones.	Improbable: small stones.	Probable-----	Poor: small stones.
TsB----- Tilsit	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
TsC----- Tilsit	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones.
WoB----- Woolper	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
AgB----- Allegheny	Moderate: seepage, slope.	Severe: piping.	Deep to water----	Favorable-----	Favorable.
AgC2, AgD----- Allegheny	Severe: slope.	Severe: piping.	Deep to water----	Slope-----	Slope.
BaB----- Beasley	Slight-----	Moderate: thin layer.	Deep to water----	Erodes easily----	Erodes easily.
BeC2----- Beasley	Slight-----	Moderate: thin layer.	Deep to water----	Slope-----	Slope.
BhE3*: Beasley-----	Severe: slope.	Moderate: thin layer.	Deep to water----	Slope-----	Slope.
Shrouds-----	Severe: slope.	Severe: thin layer.	Deep to water----	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
BkF2*: Berks-----	Severe: seepage, slope.	Severe: seepage.	Deep to water----	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.
Brownsville-----	Severe: seepage, slope.	Severe: piping, large stones.	Deep to water----	Slope, large stones.	Large stones, slope, droughty.
BrB----- Blairton	Moderate: seepage, depth to rock, slope.	Severe: piping.	Depth to rock, slope.	Depth to rock, erodes easily.	Erodes easily, droughty.
BrC2, BrE2----- Blairton	Severe: slope.	Severe: piping.	Depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, droughty.
Bs----- Boonesboro	Severe: seepage.	Severe: thin layer, piping.	Deep to water----	Depth to rock----	Depth to rock.
BwF2*: Brownsville-----	Severe: seepage, slope.	Severe: piping, large stones.	Deep to water----	Slope, large stones.	Large stones, slope, droughty.
Berks-----	Severe: seepage, slope.	Severe: seepage.	Deep to water----	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
CoF2*: Colyer-----	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water----	Slope, depth to rock.	Slope, droughty.
Trappist-----	Severe: slope.	Severe: thin layer, hard to pack.	Deep to water----	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
CrB----- Crider	Moderate: seepage.	Severe: piping.	Deep to water----	Favorable-----	Favorable.
CrC----- Crider	Moderate: seepage.	Severe: piping.	Deep to water----	Slope-----	Slope.
CyC2*: Cynthiana-----	Severe: depth to rock.	Severe: hard to pack.	Deep to water----	Slope, large stones, depth to rock.	Large stones, slope, erodes easily.
Faywood-----	Moderate: depth to rock.	Severe: thin layer, hard to pack.	Deep to water----	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
CyE2*: Cynthiana-----	Severe: depth to rock, slope.	Severe: hard to pack.	Deep to water----	Slope, large stones, depth to rock.	Large stones, slope, erodes easily.
Faywood-----	Severe: slope.	Severe: thin layer, hard to pack.	Deep to water----	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Edd2----- Eden	Moderate: depth to rock.	Severe: hard to pack, large stones.	Deep to water----	Slope, large stones, depth to rock.	Large stones, slope, erodes easily.
Efe2----- Eden	Severe: slope.	Severe: hard to pack, large stones.	Deep to water----	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
EkB----- Elk	Moderate: seepage, slope.	Severe: piping.	Deep to water----	Erodes easily----	Erodes easily.
EkC----- Elk	Severe: slope.	Severe: piping.	Deep to water----	Slope, erodes easily.	Slope, erodes easily.
FaF*: Fairmount-----	Severe: depth to rock, slope.	Severe: thin layer, large stones.	Deep to water----	Slope, large stones, depth to rock.	Large stones, slope, erodes easily.
Woolper-----	Severe: slope.	Severe: hard to pack.	Deep to water----	Erodes easily, percs slowly, slope.	Slope, erodes easily, percs slowly.
FwB----- Faywood	Moderate: depth to rock.	Severe: thin layer, hard to pack.	Deep to water----	Depth to rock, erodes easily.	Erodes easily, depth to rock.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
FyC2*, FyD2*: Faywood-----	Moderate: depth to rock.	Severe: thin layer, hard to pack.	Deep to water----	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Lowell-----	Moderate: depth to rock.	Severe: hard to pack.	Deep to water----	Slope, erodes easily.	Slope, erodes easily.
La----- Lawrence	Slight-----	Severe: piping.	Percs slowly-----	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
LoB----- Lowell	Moderate: depth to rock.	Severe: hard to pack.	Deep to water----	Erodes easily----	Erodes easily.
LoC, LoD2----- Lowell	Moderate: depth to rock.	Severe: hard to pack.	Deep to water----	Slope, erodes easily.	Slope, erodes easily.
Ma----- McGary	Slight-----	Severe: wetness.	Percs slowly-----	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Me----- Melvin	Moderate: seepage.	Severe: piping, wetness.	Flooding-----	Erodes easily, wetness.	Wetness, erodes easily.
MgB----- Monongahela	Moderate: seepage, slope.	Severe: piping.	Percs slowly, slope.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth, percs slowly.
MgC----- Monongahela	Severe: slope.	Severe: piping.	Percs slowly, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
Mo----- Morehead	Moderate: seepage.	Severe: piping, wetness.	Favorable-----	Erodes easily, wetness.	Wetness, erodes easily.
MsB2----- Muse	Moderate: depth to rock.	Moderate: hard to pack, thin layer.	Deep to water----	Erodes easily, percs slowly.	Erodes easily, percs slowly.
MsC2, MsD2----- Muse	Moderate: depth to rock.	Moderate: hard to pack, thin layer.	Deep to water----	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
MtD3*: Muse-----	Moderate: depth to rock.	Moderate: hard to pack, thin layer.	Deep to water----	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
Shrouts-----	Severe: slope.	Severe: thin layer.	Deep to water----	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
MuF2*: Muse-----	Severe: slope.	Moderate: hard to pack, thin layer.	Deep to water----	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
MuF2*: Trappist-----	Severe: slope.	Severe: thin layer, hard to pack.	Deep to water----	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Ne----- Newark	Moderate: seepage.	Severe: piping, wetness.	Flooding-----	Erodes easily, wetness.	Wetness, erodes easily.
NhB----- Nicholson	Moderate: seepage, slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
NhC----- Nicholson	Severe: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
No----- Nolin	Severe: seepage.	Severe: piping.	Deep to water----	Erodes easily----	Erodes easily.
OtB----- Otwell	Moderate: slope.	Moderate: thin layer, wetness.	Percs slowly, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
OtC----- Otwell	Severe: slope.	Moderate: thin layer, wetness.	Percs slowly, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
Pt*. Pits, quarries					
SaB----- Sandview	Moderate: slope, seepage.	Slight-----	Deep to water----	Favorable-----	Favorable.
ShC, ShD, ShF----- Shelocta	Severe: seepage, slope.	Severe: piping.	Deep to water----	Slope-----	Slope.
SrF*: Shelocta-----	Severe: seepage, slope.	Severe: piping.	Deep to water----	Slope-----	Slope.
Wharton-----	Severe: slope.	Moderate: thin layer, piping, wetness.	Percs slowly, slope.	Wetness, slope, percs slowly.	Slope, percs slowly.
SsB----- Shrouts	Moderate: depth to rock, slope.	Severe: thin layer.	Deep to water----	Depth to rock, erodes easily.	Erodes easily, depth to rock.
StC3, StD3----- Shrouts	Severe: slope.	Severe: thin layer.	Deep to water----	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Sx----- Skidmore	Severe: seepage.	Severe: seepage.	Deep to water----	Large stones----	Large stones, droughty

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
TsB----- Tilsit	Moderate: depth to rock, seepage.	Severe: piping.	Percs slowly, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
TsC----- Tilsit	Moderate: depth to rock, seepage.	Severe: piping.	Percs slowly, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
WoB----- Woolper	Slight-----	Severe: hard to pack.	Deep to water----	Erodes easily, percs slowly.	Erodes easily, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AgB----- Allegheny	0-8	Fine sandy loam	SM, ML, CL-ML, SC-SM	A-4	0	90-100	80-100	60-85	35-55	<20	NP-5
	8-48	Clay loam, loam, sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0	90-100	80-100	65-95	35-80	<35	NP-15
	48-77	Clay loam, sandy loam, gravelly sandy loam.	SM, GC, ML, CL	A-4, A-6, A-2, A-1	0-5	65-100	55-100	35-95	20-75	<35	NP-15
AgC2----- Allegheny	0-5	Fine sandy loam	SM, ML, CL-ML, SC-SM	A-4	0	90-100	80-100	60-85	35-55	<20	NP-5
	5-45	Clay loam, loam, sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0	90-100	80-100	65-95	35-80	<35	NP-15
	45-74	Clay loam, sandy loam, gravelly sandy loam.	SM, GC, ML, CL	A-4, A-6, A-2, A-1	0-5	65-100	55-100	35-95	20-75	<35	NP-15
AgD----- Allegheny	0-8	Fine sandy loam	SM, ML, CL-ML, SC-SM	A-4	0	90-100	80-100	60-85	35-55	<20	NP-5
	8-48	Clay loam, loam, sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0	90-100	80-100	65-95	35-80	<35	NP-15
	48-77	Clay loam, sandy loam, gravelly sandy loam.	SM, GC, ML, CL	A-4, A-6, A-2, A-1	0-5	65-100	55-100	35-95	20-75	<35	NP-15
BaB----- Beasley	0-10	Silt loam-----	ML, CL-ML	A-4	0-5	90-100	85-100	80-100	75-100	25-35	4-10
	10-32	Silty clay, clay	CH, CL	A-7	0-5	90-100	85-100	85-100	75-100	45-70	20-40
	32-60	Silty clay, clay loam, cherty silty clay.	CL, CH	A-7	0-10	70-100	55-100	50-100	50-95	35-65	15-35
	60-72	Weathered bedrock	---	---	---	---	---	---	---	---	---
BeC2----- Beasley	0-5	Silty clay loam	CL	A-6, A-7	0-5	90-100	85-100	80-100	75-100	34-42	15-22
	5-27	Silty clay, clay	CH, CL	A-7	0-5	90-100	85-100	85-100	75-100	45-70	20-40
	27-55	Silty clay, clay loam, cherty silty clay.	CL, CH	A-7	0-10	70-100	55-100	50-100	50-95	35-65	15-35
	55-67	Weathered bedrock	---	---	---	---	---	---	---	---	---
BhE3*: Beasley-----	0-4	Silty clay loam	CL	A-6, A-7	0-5	90-100	85-100	80-100	75-100	34-42	15-22
	4-26	Silty clay, clay	CH, CL	A-7	0-5	90-100	85-100	85-100	75-100	45-70	20-40
	26-54	Silty clay, clay loam, cherty silty clay.	CL, CH	A-7	0-10	70-100	55-100	50-100	50-95	35-65	15-35
	54-66	Weathered bedrock	---	---	---	---	---	---	---	---	---
Shrouds-----	0-4	Silty clay-----	CL, CH	A-6, A-7	0-10	90-100	90-100	85-100	80-100	30-65	12-40
	4-27	Clay, silty clay	CH, CL	A-7	0-10	90-100	90-100	85-100	80-100	45-65	20-40
	27-35	Clay, silty clay, shaly silty clay.	CH, CL	A-7	0-20	85-100	75-100	75-100	65-100	45-70	20-40
	35-40	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BkF2*: Berks-----	0-4	Very channery silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	4-27	Channery loam, very channery loam, channery silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	27-33	Silty clay, very channery loam, channery silt loam.	GM, SM, GC, CH	A-1, A-2, A-4, A-7	0-40	35-100	25-100	20-90	15-90	24-60	2-30
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Brownsville-----	0-4	Channery silt loam.	ML, CL-ML, GM, GM-GC	A-4	0-15	50-80	45-70	40-70	35-60	25-35	5-10
	4-19	Channery silt loam, extremely channery loam, very flaggy silt loam.	ML, CL-ML, GM, GM-GC	A-1, A-2, A-4	5-40	35-80	30-70	25-70	20-60	25-35	5-10
	19-54	Channery silt loam, extremely channery loam, very flaggy silt loam.	GM, GP-GM, SM, SP-SM	A-1, A-2, A-4	15-60	25-65	20-55	15-50	10-45	20-35	2-10
	54	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
BrB----- Blairton	0-8	Silt loam-----	ML, CL-ML	A-4	0	80-100	75-100	65-90	50-80	20-35	2-10
	8-20	Silt loam, channery silty clay loam, very channery loam.	ML, CL, GM	A-4, A-6, A-7, A-2	0-5	50-90	35-90	30-85	25-70	25-45	2-20
	20-29	Very channery loam, channery loam, very channery silt loam.	GM, ML, CL	A-4, A-2, A-6, A-1	0-10	15-65	15-65	15-65	10-60	25-40	2-12
	29-37	Weathered bedrock	---	---	---	---	---	---	---	---	---
BrC2, BrE2----- Blairton	0-6	Silt loam-----	ML, CL-ML	A-4	0	80-100	75-100	65-90	50-80	20-35	2-10
	6-18	Silt loam, channery silty clay loam, very channery loam.	ML, CL, GM	A-4, A-6, A-7, A-2	0-5	50-90	35-90	30-85	25-70	25-45	2-20
	18-27	Very channery loam, channery loam, very channery silt loam.	GM, ML, CL	A-4, A-2, A-6, A-1	0-10	15-65	15-65	15-65	10-60	25-40	2-12
	27-35	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Bs----- Boonesboro	0-20	Silt loam-----	ML, CL, CL-ML	A-4, A-6	0-5	90-100	85-100	80-100	70-95	25-35	3-11
	20-33	Gravelly silt loam, flaggy loam, very gravelly silty clay loam.	GM, GC, CL, CL-ML	A-2, A-4, A-6, A-7	0-20	50-75	40-70	35-65	25-60	25-42	3-20
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
BwF2*: Brownsville-----	0-4	Channery silt loam.	ML, CL-ML, GM, GM-GC	A-4	0-15	50-80	45-70	40-70	35-60	25-35	5-10
	4-19	Channery silt loam, extremely channery loam, very flaggy silt loam.	ML, CL-ML, GM, GM-GC	A-1, A-2, A-4	5-40	35-80	30-70	25-70	20-60	25-35	5-10
	19-54	Channery silt loam, extremely channery loam, very flaggy silt loam.	GM, GP-GM, SM, SP-SM	A-1, A-2, A-4	15-60	25-65	20-55	15-50	10-45	20-35	2-10
	54	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Berks-----	0-4	Very channery silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	4-27	Channery loam, very channery loam, channery silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	27-33	Silty clay, very channery loam, channery silt loam.	GM, SM, GC, CH	A-1, A-2, A-4, A-7	0-40	35-100	25-100	20-90	15-90	24-60	2-30
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CoF2*: Colyer-----	0-2	Channery silty clay loam.	CL-ML, ML, GC, GM-GC	A-4, A-6	0-5	55-80	50-75	45-75	35-70	25-40	5-15
	2-10	Channery clay, very channery silty clay, very channery silty clay loam.	GC, GM	A-2, A-6, A-7	0-10	25-60	20-50	20-50	15-45	35-55	11-30
	10-17	Channery clay, very channery silty clay, very channery silty clay loam.	GC, GM	A-2, A-6, A-7	0-15	25-60	20-50	20-50	15-45	35-55	11-30
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
CoF2*: Trappist-----	0-6	Silt loam-----	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	60-95	20-35	2-14
	6-23	Silty clay, clay, channery silty clay.	CL, CH	A-7, A-6	0	80-100	60-100	55-100	50-95	35-60	12-30
	23-35	Very channery clay, very channery silty clay, channery clay.	GC, CL, CH, SC	A-2, A-7, A-6	0-5	30-75	20-65	20-60	15-60	35-60	12-30
	35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CrB, CrC----- Crider	0-8	Silt loam-----	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	85-100	25-35	3-12
	8-30	Silt loam, silty clay loam.	CL, ML, CL-ML	A-7, A-6, A-4	0	100	95-100	90-100	85-100	25-42	3-20
	30-96	Silty clay, clay, silty clay loam.	CL, CH	A-7, A-6	0-5	85-100	75-100	70-100	60-100	35-65	15-40
CyC2*, CyE2*: Cynthiana-----	0-2	Silty clay loam	CL, CL-ML	A-4, A-6, A-7	0-30	70-100	65-100	60-100	55-100	25-42	4-20
	2-18	Flaggy clay, flaggy silty clay, clay.	CH, CL	A-7	5-30	70-100	65-100	60-100	55-100	45-75	20-45
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Faywood-----	0-5	Silt loam-----	ML, CL, CL-ML	A-4	0-15	100	95-100	90-100	85-100	25-35	4-10
	5-34	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-15	90-100	90-100	85-100	75-100	42-70	20-45
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
EdD2----- Eden	0-3	Silty clay loam	CL, CH	A-7, A-6	0-15	85-100	80-100	75-100	70-100	35-65	12-35
	3-28	Flaggy silty clay, flaggy clay, silty clay.	CH, CL	A-7	10-45	75-100	55-100	50-100	50-95	45-75	20-45
	28-35	Weathered bedrock	---	---	---	---	---	---	---	---	---
EfE2----- Eden	0-3	Flaggy silty clay loam.	CL, CH	A-7, A-6	25-40	75-95	70-95	70-95	65-95	35-65	12-35
	3-28	Flaggy silty clay, flaggy clay, silty clay.	CH, CL	A-7	10-45	75-100	55-100	50-100	50-95	45-75	20-45
	28-35	Weathered bedrock	---	---	---	---	---	---	---	---	---
EkB, EkC----- Elk	0-8	Silt loam-----	ML, CL, CL-ML	A-4	0	95-100	95-100	85-100	70-95	25-35	3-10
	8-54	Silty clay loam, silt loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	75-100	25-40	5-15
	54-78	Silty clay loam, silt loam, silty clay.	ML, CL, CL-ML, SC-SM	A-4, A-6	0	75-100	50-100	45-100	40-95	25-40	5-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
FaF*: Fairmount-----	0-6	Flaggy silty clay loam.	CL	A-6, A-7	8-50	80-100	70-100	65-100	60-95	35-45	15-22
	6-16	Flaggy silty clay loam, flaggy clay, flaggy silty clay.	CH, CL	A-7	8-50	80-100	70-100	65-100	60-100	40-70	20-40
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Woolper-----	0-23	Silt loam-----	CL, CL-ML	A-4, A-6	0-10	95-100	90-100	85-100	75-100	25-35	6-15
	23-34	Silty clay, silty clay loam, clay.	CL, CH	A-7, A-6	0-10	95-100	90-100	85-100	75-100	35-65	15-40
	34-62	Clay, silty clay	CH, CL	A-7	0-10	95-100	90-100	85-100	75-100	45-75	20-45
FwB----- Faywood	0-6	Silt loam-----	ML, CL, CL-ML	A-4	0-15	100	95-100	90-100	85-100	25-35	4-10
	6-35	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-15	90-100	90-100	85-100	75-100	42-70	20-45
	35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
FyC2*, FyD2*: Faywood-----	0-5	Silt loam-----	ML, CL, CL-ML	A-4	0-15	100	95-100	90-100	85-100	25-35	4-10
	5-34	Silty clay, clay, silty clay loam.	CH, CL	A-7	0-15	90-100	90-100	85-100	75-100	42-70	20-45
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Lowell-----	0-5	Silt loam-----	ML, CL, CL-ML	A-4	0	100	95-100	90-100	85-100	22-32	3-10
	5-23	Silty clay, clay, silty clay loam.	CL, CH, MH	A-7, A-6	0	100	95-100	90-100	85-100	35-65	15-32
	23-60	Clay, silty clay	CH, MH, CL	A-7	0-10	95-100	90-100	85-100	75-100	45-75	20-40
La----- Lawrence	0-8	Silt loam-----	ML	A-4	0	100	95-100	90-100	80-100	25-35	2-10
	8-24	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	80-100	25-42	5-20
	24-52	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	80-100	25-42	5-20
	52-64	Silty clay, silty clay loam, silt loam.	ML, CL, MH, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	75-100	25-60	5-25
LoB, LoC----- Lowell	0-7	Silt loam-----	ML, CL, CL-ML	A-4	0	100	95-100	90-100	85-100	22-32	3-10
	7-25	Silty clay, clay, silty clay loam.	CL, CH, MH	A-7, A-6	0	100	95-100	90-100	85-100	35-65	15-32
	25-60	Clay, silty clay	CH, MH, CL	A-7	0-10	95-100	90-100	85-100	75-100	45-75	20-40
LoD2----- Lowell	0-5	Silt loam-----	ML, CL, CL-ML	A-4	0	100	95-100	90-100	85-100	22-32	3-10
	5-23	Silty clay, clay, silty clay loam.	CL, CH, MH	A-7, A-6	0	100	95-100	90-100	85-100	35-65	15-32
	23-60	Clay, silty clay	CH, MH, CL	A-7	0-10	95-100	90-100	85-100	75-100	45-75	20-40

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ma----- McGary	0-8	Silt loam-----	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-95	25-40	5-15
	8-39	Silty clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	90-100	45-60	25-35
	39-48	Stratified silty clay loam to clay.	CL, CH	A-6, A-7	0	95-100	95-100	95-100	85-100	35-55	20-35
	48-54	Weathered bedrock	---	---	---	---	---	---	---	---	---
Me----- Melvin	0-6	Silt loam-----	CL, CL-ML, ML	A-4	0	95-100	90-100	80-100	80-95	25-35	4-10
	6-20	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	80-98	25-40	5-20
	20-62	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6	0	85-100	80-100	70-100	60-98	25-40	5-20
MgB, MgC----- Monongahela	0-8	Loam-----	ML, SM, CL-ML, SC-SM	A-4	0-5	90-100	85-100	75-100	45-90	20-35	1-10
	8-25	Silt loam, clay loam, gravelly loam.	ML, CL, CL-ML	A-4, A-6	0-15	90-100	80-100	75-100	70-90	20-40	5-15
	25-40	Silt loam, sandy clay loam, gravelly loam.	ML, CL, SM, SC	A-4, A-6	0-10	80-100	60-100	55-95	45-95	20-40	3-15
	40-72	Silt loam, clay loam, gravelly sandy loam.	ML, CL, SM, SC	A-4, A-6	10-20	75-100	60-90	60-85	40-85	20-40	1-15
Mo----- Morehead	0-10	Silt loam-----	ML	A-4	0	95-100	95-100	90-100	80-100	25-35	2-10
	10-58	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	75-100	25-40	5-20
	58-95	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	90-100	85-100	70-100	60-95	20-40	2-20
MsB2, MsC2, MsD2- Muse	0-3	Channery silt loam.	ML, CL, CL-ML	A-4, A-6	0	80-100	70-100	60-100	55-95	20-40	2-20
	3-46	Silty clay loam, clay, channery silty clay.	CL, CH	A-7, A-6	0	70-100	65-100	60-100	55-100	35-65	15-35
	46-59	Channery silty clay, very channery clay, clay.	MH, CH, CL, GC	A-7, A-2	0	50-100	40-95	35-95	30-95	40-75	20-40
	59	Weathered bedrock	---	---	---	---	---	---	---	---	---
MtD3*: Muse-----	0-2	Channery silt loam.	ML, CL, CL-ML	A-4, A-6	0	80-100	70-100	60-100	55-95	20-40	2-20
	2-45	Silty clay loam, clay, channery silty clay.	CL, CH	A-7, A-6	0	70-100	65-100	60-100	55-100	35-65	15-35
	45-58	Channery silty clay, very channery clay, clay.	MH, CH, CL, GC	A-7, A-2	0	50-100	40-95	35-95	30-95	40-75	20-40
	58	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct						
MtD3*: Shrouds-----	0-4	Silty clay-----	CL, CH	A-6, A-7	0-10	90-100	90-100	85-100	80-100	30-65	12-40
	4-27	Clay, silty clay	CH, CL	A-7	0-10	90-100	90-100	85-100	80-100	45-65	20-40
	27-35	Clay, silty clay, shaly silty clay.	CH, CL	A-7	0-20	85-100	75-100	75-100	65-100	45-70	20-40
	35-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
MuF2*: Muse-----	0-3	Channery silt loam.	ML, CL, CL-ML	A-4, A-6	0	80-100	70-100	60-100	55-95	20-40	2-20
	3-46	Silty clay loam, clay, channery silty clay.	CL, CH	A-7, A-6	0	70-100	65-100	60-100	55-100	35-65	15-35
	46-59	Channery silty clay, very channery clay, clay.	MH, CH, CL, GC	A-7, A-2	0	50-100	40-95	35-95	30-95	40-75	20-40
	59	Weathered bedrock	---	---	---	---	---	---	---	---	---
Trappist-----	0-6	Silt loam-----	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	60-95	20-35	2-14
	6-23	Silty clay, clay, channery silty clay.	CL, CH	A-7, A-6	0	80-100	60-100	55-100	50-95	35-60	12-30
	23-35	Very channery clay, very channery silty clay, channery clay.	GC, CL, CH, SC	A-2, A-7, A-6	0-5	30-75	20-65	20-60	15-60	35-60	12-30
	35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ne----- Newark	0-8	Silt loam-----	ML, CL, CL-ML	A-4	0	95-100	90-100	80-100	55-95	<32	NP-10
	8-22	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	70-100	22-42	3-20
	22-62	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-3	75-100	70-100	65-100	55-95	22-42	3-20
NhB, NhC----- Nicholson	0-9	Silt loam-----	ML, CL, CL-ML	A-4	0	95-100	95-100	85-100	80-95	25-35	5-10
	9-28	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-4, A-7	0	95-100	85-100	85-100	80-100	25-45	5-20
	28-41	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-4, A-7	0	95-100	90-100	80-100	75-100	25-45	5-20
	41-74	Silty clay, clay, channery clay.	CH, CL	A-6, A-7	0-10	80-100	70-100	60-100	55-100	34-70	16-40
No----- Nolin	0-8	Silt loam-----	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	8-53	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	85-100	75-100	25-46	5-23
	53-65	Loam, silt loam, gravelly loam.	ML, CL, CL-ML, GM	A-4, A-6	0-10	50-100	50-100	40-95	35-95	<30	NP-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
OtB, OtC----- Otwell	0-10	Silt loam-----	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-95	25-35	5-15
	10-30	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6	0	100	100	95-100	70-95	25-40	5-20
	30-56	Silty clay loam, loam, silt loam.	CL	A-6, A-7	0	95-100	95-100	85-100	65-90	35-50	20-30
	56-77	Stratified loam to silty clay.	CL	A-6, A-7	0	95-100	90-100	85-100	65-95	35-50	15-25
Pt*. Pits, quarries											
SaB----- Sandview	0-14	Silt loam-----	ML, CL, CL-ML	A-4	0	100	95-100	90-100	80-95	25-35	5-10
	14-42	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	85-100	25-45	5-20
	42-98	Silty clay, clay	CH, CL	A-7	0-10	90-100	90-100	85-100	75-100	45-75	20-45
ShC----- Shelocta	0-7	Gravelly silt loam.	ML, GM, SM	A-4	0-10	55-95	50-80	40-70	36-65	<35	NP-10
	7-35	Silty clay loam, silt loam, channery silty clay loam.	CL, CL-ML, GC, SC	A-6, A-4	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	35-60	Channery silt loam, channery silty clay loam, very channery clay loam.	GM, GC, ML, CL	A-4, A-6, A-2, A-1-b	0-15	40-85	35-70	25-70	20-65	20-40	3-20
ShD----- Shelocta	0-9	Gravelly silt loam.	ML, GM, SM	A-4	0-10	55-95	50-80	40-70	36-65	<35	NP-10
	9-35	Silty clay loam, silt loam, channery silty clay loam.	CL, CL-ML, GC, SC	A-6, A-4	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	35-60	Channery silt loam, channery silty clay loam, very channery clay loam.	GM, GC, ML, CL	A-4, A-6, A-2, A-1-b	0-15	40-85	35-70	25-70	20-65	20-40	3-20
ShF----- Shelocta	0-7	Gravelly silt loam.	ML, GM, SM	A-4	0-10	55-95	50-80	40-70	36-65	<35	NP-10
	7-35	Silty clay loam, silt loam, channery silty clay loam.	CL, CL-ML, GC, SC	A-6, A-4	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	35-60	Channery silt loam, channery silty clay loam, very channery clay loam.	GM, GC, ML, CL	A-4, A-6, A-2, A-1-b	0-15	40-85	35-70	25-70	20-65	20-40	3-20

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct						
SrF*: Shelocta-----	0-7	Gravelly silt loam.	ML, GM, SM	A-4	0-10	55-95	50-80	40-70	36-65	<35	NP-10
	7-35	Silty clay loam, silt loam, channery silty clay loam.	CL, CL-ML, GC, SC	A-6, A-4	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	35-60	Channery silt loam, channery silty clay loam, very channery clay loam.	GM, GC, ML, CL	A-4, A-6, A-2, A-1-b	0-15	40-85	35-70	25-70	20-65	20-40	3-20
Wharton-----	0-5	Silt loam-----	ML, CL	A-4, A-6	0-5	95-100	90-100	80-95	70-90	---	---
	5-34	Clay loam, shaly silty clay loam, channery silt loam.	ML, CL	A-7, A-6	0-25	75-100	70-100	65-95	60-90	35-45	10-25
	34-41	Silt loam, channery clay, very channery silt loam.	ML, GM, SM	A-4, A-6, A-7, A-2	0-50	45-100	30-100	25-95	25-90	30-45	5-15
	41-46	Weathered bedrock	---	---	---	---	---	---	---	---	---
SsB----- Shrouts	0-6	Silty clay loam	ML, CL-ML	A-4, A-6	0	100	90-100	85-100	80-100	24-40	4-12
	6-29	Clay, silty clay	CH, CL	A-7	0-10	90-100	90-100	85-100	80-100	45-65	20-40
	29-37	Clay, silty clay, shaly silty clay.	CH, CL	A-7	0-20	85-100	75-100	75-100	65-100	45-70	20-40
	37-42	Weathered bedrock	---	---	---	---	---	---	---	---	---
StC3, StD3----- Shrouts	0-4	Silty clay-----	CL, CH	A-6, A-7	0-10	90-100	90-100	85-100	80-100	30-65	12-40
	4-27	Clay, silty clay	CH, CL	A-7	0-10	90-100	90-100	85-100	80-100	45-65	20-40
	27-35	Clay, silty clay, shaly silty clay.	CH, CL	A-7	0-20	85-100	75-100	75-100	65-100	45-70	20-40
	35-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Sx----- Skidmore	0-8	Gravelly loam----	GM, SM, ML	A-4, A-2	0-10	60-90	40-85	40-75	25-60	<30	NP-7
	8-60	Gravelly fine sandy loam, very channery sandy loam, very gravelly loam.	GM, GP-GM	A-2, A-1	5-30	35-60	20-50	15-40	10-35	<30	NP-5
TsB, TsC----- Tilsit	0-8	Silt loam-----	CL, CL-ML	A-4, A-6	0	90-100	85-100	75-100	60-100	20-35	4-15
	8-25	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6	0	90-100	85-100	75-100	65-100	25-40	5-20
	25-60	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	90-100	85-100	75-100	65-100	25-45	5-25
WoB----- Woolper	0-23	Silt loam-----	CL, CL-ML	A-4, A-6	0-10	95-100	90-100	85-100	75-100	25-35	6-15
	23-34	Silty clay, silty clay loam, clay.	CL, CH	A-7, A-6	0-10	95-100	90-100	85-100	75-100	35-65	15-40
	34-62	Clay, silty clay	CH, CL	A-7	0-10	95-100	90-100	85-100	75-100	45-75	20-45

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
AgB----- Allegheny	0-8	10-20	1.20-1.40	2.0-6.0	0.12-0.16	3.6-5.5	Low-----	0.28	4	1-4
	8-48	18-35	1.20-1.50	0.6-2.0	0.13-0.18	3.6-5.5	Low-----	0.28		
	48-77	10-35	1.20-1.40	0.6-2.0	0.08-0.17	3.6-5.5	Low-----	0.28		
AgC2----- Allegheny	0-5	10-20	1.20-1.40	2.0-6.0	0.12-0.16	3.6-5.5	Low-----	0.28	4	1-4
	5-45	18-35	1.20-1.50	0.6-2.0	0.13-0.18	3.6-5.5	Low-----	0.28		
	45-74	10-35	1.20-1.40	0.6-2.0	0.08-0.17	3.6-5.5	Low-----	0.28		
AgD----- Allegheny	0-8	10-20	1.20-1.40	2.0-6.0	0.12-0.16	3.6-5.5	Low-----	0.28	4	1-4
	8-48	18-35	1.20-1.50	0.6-2.0	0.13-0.18	3.6-5.5	Low-----	0.28		
	48-77	10-35	1.20-1.40	0.6-2.0	0.08-0.17	3.6-5.5	Low-----	0.28		
BaB----- Beasley	0-10	10-35	1.20-1.40	0.6-2.0	0.18-0.23	4.5-7.3	Low-----	0.43	3	.5-4
	10-32	40-60	1.30-1.55	0.2-0.6	0.12-0.18	5.6-8.4	Moderate----	0.28		
	32-60	40-60	1.50-1.70	0.2-0.6	0.09-0.15	6.6-8.4	Moderate----	0.28		
	60-72	---	---	---	---	---	-----	---		
BeC2----- Beasley	0-5	27-55	1.20-1.40	0.6-2.0	0.14-0.23	4.5-7.3	Low-----	0.32	3	.5-2
	5-27	40-60	1.30-1.55	0.2-0.6	0.12-0.18	5.6-8.4	Moderate----	0.28		
	27-55	40-60	1.50-1.70	0.2-0.6	0.09-0.15	6.6-8.4	Moderate----	0.28		
	55-67	---	---	---	---	---	-----	---		
BhE3*: Beasley-----	0-4	27-55	1.20-1.40	0.6-2.0	0.14-0.23	4.5-7.3	Low-----	0.32	3	.5-2
	4-26	40-60	1.30-1.55	0.2-0.6	0.12-0.18	5.6-8.4	Moderate----	0.28		
	26-54	40-60	1.50-1.70	0.2-0.6	0.09-0.15	6.6-8.4	Moderate----	0.28		
	54-66	---	---	---	---	---	-----	---		
Shrouds-----	0-4	27-55	1.40-1.75	0.06-0.2	0.15-0.20	5.1-8.4	Moderate----	0.32	2	2-6
	4-27	40-65	1.40-1.65	0.06-0.2	0.13-0.17	5.1-8.4	Moderate----	0.37		
	27-35	40-65	1.40-1.80	<0.06	0.08-0.14	6.6-8.4	Moderate----	0.37		
	35-40	---	---	---	---	---	-----	---		
BkF2*: Berks-----	0-4	5-23	1.20-1.50	0.6-6.0	0.04-0.10	3.6-6.5	Low-----	0.17	3	1-3
	4-27	5-32	1.20-1.60	0.6-6.0	0.04-0.10	3.6-6.5	Low-----	0.17		
	27-33	5-40	1.20-1.60	2.0-6.0	0.04-0.10	3.6-6.5	Low-----	0.17		
	33	---	---	---	---	---	-----	---		
Brownsville-----	0-4	8-27	1.20-1.45	0.6-6.0	0.09-0.17	3.6-6.5	Low-----	0.20	5	1-3
	4-19	8-27	1.30-1.60	0.6-6.0	0.07-0.14	3.6-5.5	Low-----	0.17		
	19-54	8-35	1.30-1.60	2.0-6.0	0.03-0.12	3.6-5.5	Low-----	0.17		
	54	---	---	---	---	---	-----	---		
BrB----- Blairton	0-8	10-27	1.40-1.60	0.6-2.0	0.14-0.18	3.6-5.5	Low-----	0.43	3-2	1-4
	8-20	18-35	1.50-1.70	0.2-0.6	0.08-0.14	3.6-5.5	Low-----	0.32		
	20-29	20-40	1.40-1.60	0.2-2.0	0.04-0.10	3.6-5.5	Low-----	0.32		
	29-37	---	---	---	---	---	-----	---		
BrC2, BrE2----- Blairton	0-6	10-27	1.40-1.60	0.6-2.0	0.14-0.18	3.6-5.5	Low-----	0.43	3-2	1-4
	6-18	18-35	1.50-1.70	0.2-0.6	0.08-0.14	3.6-5.5	Low-----	0.32		
	18-27	20-40	1.40-1.60	0.2-2.0	0.04-0.10	3.6-5.5	Low-----	0.32		
	27-35	---	---	---	---	---	-----	---		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction pH	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Bs----- Boonesboro	0-20 20-33 33	15-27 18-35 ---	1.20-1.40 1.20-1.40 ---	0.6-2.0 6.0-20 ---	0.18-0.23 0.06-0.12 ---	6.1-8.4 6.1-8.4 ---	Low----- Low----- -----	0.37 0.17 ---	3	3-5
BwF2*: Brownsville-----	0-4 4-19 19-54 54	8-27 8-27 8-35 ---	1.20-1.45 1.30-1.60 1.30-1.60 ---	0.6-6.0 0.6-6.0 2.0-6.0 ---	0.09-0.17 0.07-0.14 0.03-0.12 ---	3.6-6.5 3.6-5.5 3.6-5.5 ---	Low----- Low----- Low----- -----	0.20 0.17 0.17 ---	5	1-3
Berks-----	0-4 4-27 27-33 33	5-23 5-32 5-40 ---	1.20-1.50 1.20-1.60 1.20-1.60 ---	0.6-6.0 0.6-6.0 2.0-6.0 ---	0.04-0.10 0.04-0.10 0.04-0.10 ---	3.6-6.5 3.6-6.5 3.6-6.5 ---	Low----- Low----- Low----- -----	0.17 0.17 0.17 ---	3	1-3
CoF2*: Colyer-----	0-2 2-10 10-17 17	27-40 35-59 35-59 ---	1.20-1.50 1.30-1.60 1.30-1.60 ---	0.6-2.0 0.06-0.2 0.06-0.2 ---	0.10-0.16 0.03-0.10 0.03-0.10 ---	3.6-6.0 3.6-5.0 3.6-5.0 ---	Low----- Low----- Low----- -----	0.28 0.17 0.17 ---	2	.5-2
Trappist-----	0-6 6-23 23-35 35	7-27 30-60 35-60 ---	1.20-1.40 1.40-1.65 1.40-1.60 ---	0.6-2.0 0.2-0.6 0.06-0.2 ---	0.15-0.23 0.08-0.18 0.05-0.12 ---	3.6-5.5 3.6-5.5 3.6-5.5 ---	Low----- Moderate----- Moderate----- -----	0.37 0.28 0.24 ---	3	1-3
CrB, CrC----- Crider	0-8 8-30 30-96	15-27 18-35 30-60	1.20-1.40 1.20-1.45 1.20-1.55	0.6-2.0 0.6-2.0 0.6-2.0	0.19-0.23 0.18-0.23 0.12-0.18	5.1-7.3 5.1-7.3 4.5-6.5	Low----- Low----- Moderate-----	0.32 0.28 0.28	5	2-4
CyC2*, CyE2*: Cynthiana-----	0-2 2-18 18	15-40 40-60 ---	1.20-1.40 1.35-1.60 ---	0.6-2.0 0.2-0.6 ---	0.15-0.20 0.08-0.15 ---	6.1-7.8 6.1-7.8 ---	Moderate----- Moderate----- -----	0.37 0.28 ---	2	1-4
Faywood-----	0-5 5-34 34	15-27 35-60 ---	1.30-1.40 1.35-1.45 ---	0.6-2.0 0.06-0.6 ---	0.18-0.22 0.12-0.17 ---	5.1-7.8 5.1-7.8 ---	Low----- Moderate----- -----	0.37 0.28 ---	3	1-4
Edd2----- Eden	0-3 3-28 28-35	27-50 40-60 ---	1.35-1.55 1.45-1.65 ---	0.06-0.6 0.06-0.2 ---	0.12-0.18 0.08-0.13 ---	4.5-8.4 4.5-8.4 ---	Moderate----- Moderate----- -----	0.43 0.28 0.17	3	.5-3
Efe2----- Eden	0-3 3-28 28-35	27-60 40-60 ---	1.45-1.65 1.45-1.65 ---	0.06-0.6 0.06-0.2 ---	0.11-0.17 0.08-0.13 ---	4.5-8.4 4.5-8.4 ---	Moderate----- Moderate----- -----	0.17 0.28 ---	3	.5-3
EkB, EkC----- Elk	0-8 8-54 54-78	10-27 18-34 15-40	1.20-1.40 1.20-1.50 1.20-1.50	0.6-2.0 0.6-2.0 0.6-2.0	0.19-0.23 0.18-0.22 0.14-0.20	4.5-6.5 4.5-6.5 4.5-6.5	Low----- Low----- Low-----	0.37 0.28 0.28	5	.5-3
FaF*: Fairmount-----	0-6 6-16 16	27-40 35-60 ---	1.20-1.40 1.40-1.60 ---	0.06-0.6 0.06-0.6 ---	0.12-0.20 0.10-0.18 ---	6.6-8.4 6.6-8.4 ---	Moderate----- Moderate----- -----	0.37 0.37 ---	2	3-7
Woolper-----	0-23 23-34 34-62	15-27 36-50 40-60	1.30-1.50 1.30-1.55 1.45-1.65	0.6-2.0 0.2-2.0 0.06-0.6	0.18-0.22 0.13-0.19 0.12-0.17	6.1-7.8 6.1-7.8 6.1-7.8	Low----- Moderate----- Moderate-----	0.37 0.28 0.28	3	4-6

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction pH	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
FwB----- Faywood	0-6	15-27	1.30-1.40	0.6-2.0	0.18-0.22	5.1-7.8	Low-----	0.37	3	1-4
	6-35	35-60	1.35-1.45	0.06-0.6	0.12-0.17	5.1-7.8	Moderate----	0.28		
	35	---	---	---	---	---	-----	---		
FyC2*, FyD2*: Faywood-----	0-5	15-27	1.30-1.40	0.6-2.0	0.18-0.22	5.1-7.8	Low-----	0.37	3	1-4
	5-34	35-60	1.35-1.45	0.06-0.6	0.12-0.17	5.1-7.8	Moderate----	0.28		
	34	---	---	---	---	---	-----	---		
Lowell-----	0-5	12-27	1.20-1.40	0.6-2.0	0.18-0.23	4.5-6.5	Low-----	0.37	3	1-4
	5-23	35-60	1.30-1.60	0.2-2.0	0.13-0.19	4.5-6.5	Moderate----	0.28		
	23-60	40-60	1.50-1.60	0.2-0.6	0.12-0.17	5.1-7.8	Moderate----	0.28		
La----- Lawrence	0-8	12-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-6.5	Low-----	0.43	3	1-4
	8-24	18-35	1.40-1.60	0.6-2.0	0.18-0.22	4.5-6.5	Low-----	0.37		
	24-52	18-35	1.50-1.70	0.06-0.2	0.08-0.12	4.5-5.5	Low-----	0.43		
	52-64	18-60	1.50-1.70	0.06-0.6	0.08-0.12	4.5-7.3	Low-----	0.37		
LoB, LoC----- Lowell	0-7	12-27	1.20-1.40	0.6-2.0	0.18-0.23	4.5-6.5	Low-----	0.37	3	1-4
	7-25	35-60	1.30-1.60	0.2-2.0	0.13-0.19	4.5-6.5	Moderate----	0.28		
	25-60	40-60	1.50-1.60	0.2-0.6	0.12-0.17	5.1-7.8	Moderate----	0.28		
LoD2----- Lowell	0-5	12-27	1.20-1.40	0.6-2.0	0.18-0.23	4.5-6.5	Low-----	0.37	3	1-4
	5-23	35-60	1.30-1.60	0.2-2.0	0.13-0.19	4.5-6.5	Moderate----	0.28		
	23-60	40-60	1.50-1.60	0.2-0.6	0.12-0.17	5.1-7.8	Moderate----	0.28		
Ma----- McGary	0-8	22-27	1.35-1.50	0.6-2.0	0.22-0.24	6.1-7.3	Low-----	0.43	3	1-4
	8-39	35-50	1.60-1.70	0.06-0.2	0.11-0.13	5.1-7.8	High-----	0.32		
	39-48	35-50	1.55-1.65	<0.2	0.14-0.16	7.9-8.4	High-----	0.32		
	48-54	---	---	---	---	---	-----	---		
Me----- Melvin	0-6	12-17	1.20-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low-----	0.43	5	1-3
	6-20	12-35	1.30-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low-----	0.43		
	20-62	7-35	1.40-1.70	0.6-2.0	0.16-0.23	5.6-7.8	Low-----	0.43		
MgB, MgC----- Monongahela	0-8	10-27	1.20-1.40	0.6-2.0	0.18-0.24	4.5-5.5	Low-----	0.43	3	2-4
	8-25	18-35	1.30-1.50	0.6-2.0	0.14-0.18	4.5-5.5	Low-----	0.43		
	25-40	18-35	1.30-1.60	0.06-0.6	0.08-0.12	4.5-5.5	Low-----	0.43		
	40-72	10-35	1.20-1.40	0.2-0.6	0.08-0.12	4.5-5.5	Low-----	0.37		
Mo----- Morehead	0-10	12-27	1.20-1.50	0.6-2.0	0.19-0.23	4.5-5.5	Low-----	0.37	4	1-4
	10-58	18-35	1.20-1.50	0.6-2.0	0.18-0.22	4.5-5.5	Low-----	0.43		
	58-95	7-40	1.20-1.50	0.6-2.0	0.15-0.22	4.5-5.5	Low-----	0.43		
MsB2, MsC2, MsD2- Muse	0-3	7-27	1.20-1.40	0.6-2.0	0.16-0.22	3.6-5.5	Low-----	0.37	3	1-3
	3-46	28-60	1.20-1.65	0.06-0.2	0.10-0.16	3.6-5.5	Moderate----	0.28		
	46-59	40-60	1.40-1.65	0.06-0.2	0.08-0.14	3.6-5.5	Moderate----	0.28		
	59	---	---	---	---	---	-----	---		
Mtd3*: Muse-----	0-2	7-27	1.20-1.40	0.6-2.0	0.16-0.22	3.6-5.5	Low-----	0.37	3	.5-3
	2-45	28-60	1.20-1.65	0.06-0.2	0.10-0.16	3.6-5.5	Moderate----	0.28		
	45-58	40-60	1.40-1.65	0.06-0.2	0.08-0.14	3.6-5.5	Moderate----	0.28		
	58	---	---	---	---	---	-----	---		
Shrouds-----	0-4	40-55	1.40-1.75	0.06-0.2	0.15-0.20	5.1-8.4	Moderate----	0.32	2	2-6
	4-27	40-65	1.40-1.65	0.06-0.2	0.13-0.17	5.1-8.4	Moderate----	0.37		
	27-35	40-65	1.40-1.80	<0.06	0.08-0.14	6.6-8.4	Moderate----	0.37		
	35-40	---	---	---	---	---	-----	---		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction pH	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
MuF2*: Muse-----	0-3	7-27	1.20-1.40	0.6-2.0	0.16-0.22	3.6-5.5	Low-----	0.37	3	1-3
	3-46	28-60	1.20-1.65	0.06-0.2	0.10-0.16	3.6-5.5	Moderate-----	0.28		
	46-59	40-60	1.40-1.65	0.06-0.2	0.08-0.14	3.6-5.5	Moderate-----	0.28		
	59	---	---	---	---	---	-----	---		
Trappist-----	0-6	7-27	1.20-1.40	0.6-2.0	0.15-0.23	3.6-5.5	Low-----	0.37	3	1-3
	6-23	30-60	1.40-1.65	0.2-0.6	0.08-0.18	3.6-5.5	Moderate-----	0.28		
	23-35	35-60	1.40-1.60	0.06-0.2	0.05-0.12	3.6-5.5	Moderate-----	0.24		
	35	---	---	---	---	---	-----	---		
Ne----- Newark	0-8	7-27	1.20-1.40	0.6-2.0	0.15-0.23	5.6-7.8	Low-----	0.43	5	1-4
	8-22	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.6-7.8	Low-----	0.43		
	22-62	12-40	1.30-1.50	0.6-2.0	0.15-0.22	5.6-7.8	Low-----	0.43		
NhB, NhC----- Nicholson	0-9	12-30	1.20-1.40	0.6-2.0	0.19-0.23	4.5-6.5	Low-----	0.43	3	2-4
	9-28	18-35	1.40-1.60	0.6-2.0	0.18-0.22	4.5-6.5	Low-----	0.43		
	28-41	18-35	1.50-1.70	0.06-0.2	0.07-0.12	4.5-6.5	Low-----	0.43		
	41-74	35-60	1.40-1.60	0.06-0.6	0.07-0.12	5.1-7.8	Moderate-----	0.37		
No----- Nolin	0-8	12-35	1.20-1.40	0.6-2.0	0.18-0.23	5.6-8.4	Low-----	0.43	5	2-4
	8-53	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-8.4	Low-----	0.43		
	53-65	10-30	1.30-1.55	0.6-6.0	0.10-0.23	5.1-8.4	Low-----	0.43		
OtB, OtC----- Otwell	0-10	18-27	1.25-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low-----	0.43	4	1-3
	10-30	22-35	1.30-1.45	0.2-0.6	0.18-0.22	4.5-5.5	Low-----	0.43		
	30-56	18-30	1.60-1.80	<0.06	0.06-0.08	4.5-5.5	Moderate-----	0.43		
	56-77	20-45	1.55-1.65	0.06-0.2	0.19-0.21	5.1-8.4	Moderate-----	0.43		
Pt* Pits, quarries										
SaB----- Sandview	0-14	10-27	1.30-1.40	0.6-2.0	0.18-0.23	4.5-7.3	Low-----	0.37	5	1-4
	14-42	18-34	1.30-1.45	0.6-2.0	0.18-0.23	4.5-7.3	Low-----	0.32		
	42-98	40-65	1.35-1.60	0.2-0.6	0.12-0.18	5.1-7.8	Moderate-----	0.28		
ShC----- Shelocta	0-7	10-25	1.15-1.30	0.6-2.0	0.10-0.18	4.5-5.5	Low-----	0.28	4	.5-5
	7-35	18-34	1.30-1.55	0.6-2.0	0.10-0.20	4.5-5.5	Low-----	0.28		
	35-60	15-34	1.30-1.55	0.6-6.0	0.08-0.16	4.5-5.5	Low-----	0.17		
ShD----- Shelocta	0-9	10-25	1.15-1.30	0.6-2.0	0.10-0.18	4.5-5.5	Low-----	0.28	4	.5-5
	9-35	18-34	1.30-1.55	0.6-2.0	0.10-0.20	4.5-5.5	Low-----	0.28		
	35-60	15-34	1.30-1.55	0.6-6.0	0.08-0.16	4.5-5.5	Low-----	0.17		
ShF----- Shelocta	0-7	10-25	1.15-1.30	0.6-2.0	0.10-0.18	4.5-5.5	Low-----	0.28	4	.5-5
	7-35	18-34	1.30-1.55	0.6-2.0	0.10-0.20	4.5-5.5	Low-----	0.28		
	35-60	15-34	1.30-1.55	0.6-6.0	0.08-0.16	4.5-5.5	Low-----	0.17		
SrF*: Shelocta-----	0-7	10-25	1.15-1.30	0.6-2.0	0.10-0.18	4.5-5.5	Low-----	0.28	4	.5-5
	7-35	18-34	1.30-1.55	0.6-2.0	0.10-0.20	4.5-5.5	Low-----	0.28		
	35-60	15-34	1.30-1.55	0.6-6.0	0.08-0.16	4.5-5.5	Low-----	0.17		
Wharton-----	0-5	15-25	1.10-1.30	0.6-2.0	0.16-0.20	4.0-5.5	Low-----	0.37	3	1-4
	5-34	15-35	1.20-1.50	0.06-0.6	0.12-0.16	4.0-5.5	Moderate-----	0.24		
	34-41	20-45	1.20-1.60	0.06-0.6	0.08-0.12	4.0-5.5	Moderate-----	0.17		
	41-46	---	---	---	---	---	-----	---		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
SsB----- Shrouts	0-6	12-35	1.40-1.55	0.06-0.2	0.15-0.20	5.1-8.4	Low-----	0.43	2	2-6
	6-29	40-65	1.40-1.65	0.06-0.2	0.13-0.17	5.1-8.4	Moderate----	0.37		
	29-37	40-65	1.40-1.80	<0.06	0.08-0.14	6.6-8.4	Moderate----	0.37		
	37-42	---	---	---	---	---	-----	---		
StC3, StD3----- Shrouts	0-4	40-55	1.40-1.75	0.06-0.2	0.15-0.20	5.1-8.4	Moderate----	0.32	2	2-6
	4-27	40-65	1.40-1.65	0.06-0.2	0.13-0.17	5.1-8.4	Moderate----	0.37		
	27-35	40-65	1.40-1.80	<0.06	0.08-0.14	6.6-8.4	Moderate----	0.37		
	35-40	---	---	---	---	---	-----	---		
Sx----- Skidmore	0-8	7-18	1.20-1.40	2.0-6.0	0.07-0.13	5.6-7.8	Low-----	0.17	5	1-3
	8-60	7-18	1.30-1.60	2.0-6.0	0.04-0.10	5.6-7.8	Low-----	0.17		
TsB, TsC----- Tilsit	0-8	10-25	1.20-1.55	0.6-2.0	0.16-0.22	3.6-5.5	Low-----	0.43	3	1-3
	8-25	18-35	1.30-1.55	0.6-2.0	0.16-0.22	3.6-5.5	Low-----	0.43		
	25-60	18-45	1.40-1.65	0.06-0.2	0.08-0.12	3.6-5.5	Low-----	0.43		
WoB----- Woolper	0-23	15-27	1.30-1.50	0.6-2.0	0.18-0.22	6.1-7.8	Low-----	0.37	3	4-6
	23-34	36-50	1.30-1.55	0.2-2.0	0.13-0.19	6.1-7.8	Moderate----	0.28		
	34-62	40-60	1.45-1.65	0.06-0.6	0.12-0.17	6.1-7.8	Moderate----	0.28		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					<u>Ft</u>			<u>In</u>			
AgB, AgC2, AgD----- Allegheny	B	None-----	---	---	>6.0	---	---	>60	---	Low-----	High.
BaB, BeC2----- Beasley	C	None-----	---	---	>6.0	---	---	>40	Soft	Moderate	Moderate.
BhE3*: Beasley-----	C	None-----	---	---	>6.0	---	---	>40	Soft	Moderate	Moderate.
Shrouts-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	High-----	Low.
BkF2*: Berks-----	C	None-----	---	---	>6.0	---	---	20-40	Hard	Low-----	High.
Brownsville-----	C	None-----	---	---	>6.0	---	---	40-72	Hard	Low-----	High.
BrB, BrC2, BrE2--- Blairton	C	None-----	---	---	2.0-3.5	Perched	Jan-Mar	20-40	Soft	High-----	High.
Bs----- Boonesboro	B	Frequent-----	Brief-----	Jan-Apr	>6.0	---	---	20-40	Hard	Low-----	Low.
BwF2*: Brownsville-----	C	None-----	---	---	>6.0	---	---	40-72	Hard	Low-----	High.
Berks-----	C	None-----	---	---	>6.0	---	---	20-40	Hard	Low-----	High.
CoF2*: Colyer-----	D	None-----	---	---	>6.0	---	---	8-20	Hard	High-----	High.
Trappist-----	C	None-----	---	---	>6.0	---	---	20-40	Hard	High-----	High.
CrB, CrC----- Crider	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
CyC2*, CyE2*: Cynthiana-----	D	None-----	---	---	>6.0	---	---	10-20	Hard	Moderate	Low.
Faywood-----	C	None-----	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
Edd2, Efe2----- Eden	C	None-----	---	---	>6.0	---	---	20-40	Soft	Moderate	Low.
EkB, EkC----- Elk	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
FaF*: Fairmount-----	D	None-----	---	---	>6.0	---	---	10-20	Hard	Moderate	Low.
Woolper-----	C	None-----	---	---	>6.0	---	---	>60	---	Moderate	Low.
FwB----- Faywood	C	None-----	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
FyC2*, FyD2*: Faywood-----	C	None-----	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					<u>Ft</u>			<u>In</u>			
FyC2*, FyD2*: Lowell-----	C	None-----	---	---	>6.0	---	---	>40	Hard	High-----	Moderate.
La----- Lawrence	C	None-----	---	---	1.0-2.0	Perched	Dec-Apr	>60	---	High-----	High.
LoB, LoC, LoD2-- Lowell	C	None-----	---	---	>6.0	---	---	>40	Hard	High-----	Moderate.
Ma----- McGary	C	None-----	---	---	1.0-3.0	Apparent	Jan-Apr	40-60	Soft	High-----	Low.
Me----- Melvin	D	Frequent----	Brief-----	Jan-Apr	0-1.0	Apparent	Jan-May	>60	---	High-----	Low.
MgB, MgC-- Monongahela	C	None-----	---	---	1.5-3.0	Perched	Dec-Apr	>60	---	High-----	High.
Mo----- Morehead	C	Rare-----	---	---	0.5-2.5	Apparent	Dec-Apr	>60	---	Moderate	High.
MsB2, MsC2, MsD2-- Muse	C	None-----	---	---	>4.0	Apparent	Jan-Apr	>40	Hard	High-----	High.
MtD3*: Muse-----	C	None-----	---	---	>4.0	Apparent	Jan-Apr	>40	Hard	High-----	High.
Shrouts-----	D	None-----	---	---	>6.0	---	---	20-40	Soft	High-----	Low.
MuF2*: Muse-----	C	None-----	---	---	>4.0	Apparent	Jan-Apr	>40	Hard	High-----	High.
Trappist-----	C	None-----	---	---	>6.0	---	---	20-40	Hard	High-----	High.
Ne----- Newark	C	Occasional	Brief-----	Jan-Apr	0.5-1.5	Apparent	Jan-May	>60	---	High-----	Low.
NhB, NhC----- Nicholson	C	None-----	---	---	1.5-2.5	Perched	Jan-Apr	>60	---	High-----	Moderate.
No----- Nolin	B	Occasional	Brief-----	Jan-Apr	3.0-6.0	Apparent	Feb-Mar	>60	---	Low-----	Moderate.
OtB, OtC----- Otwell	C	None-----	---	---	2.0-3.5	Perched	Jan-Apr	>60	---	Moderate	High.
Pt* Pits, quarries											
SaB----- Sandview	B	None-----	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
ShC, ShD, ShF----- Shelocta	B	None-----	---	---	>6.0	---	---	>48	Hard	Low-----	High.
SrF*: Shelocta-----	B	None-----	---	---	>6.0	---	---	>48	Hard	Low-----	High.
Wharton-----	C	None-----	---	---	1.5-3.0	Perched	Jan-Mar	>40	Soft	High-----	High.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro- logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard- ness	Uncoated steel	Concrete
					<u>Ft</u>			<u>In</u>			
SsB, StC3, StD3--- Shrouts	D	None-----	---	---	>6.0	---	---	20-40	Soft	High-----	Low.
Sx----- Skidmore	B	Occasional	Very brief	Jan-Apr	3.0-4.0	Apparent	Jan-Mar	>40	Hard	Low-----	Moderate.
TsB, TsC----- Tilsit	C	None-----	---	---	1.5-2.5	Perched	Jan-Apr	>40	Hard	High-----	High.
WoB----- Woolper	C	Rare-----	---	---	>6.0	---	---	>60	---	Moderate	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--PHYSICAL ANALYSES OF SELECTED SOILS

(A dash indicates that the material was not detected. A blank indicates that a determination was not made. Unless otherwise noted, the pedons for the soils listed are typical of the series in the county. For the location of the pedons, see the section "Soil Series and Their Morphology." The analyses were made by the Kentucky Agricultural Experiment Station)

Soil name, report number, horizon, and depth in inches	Size class and particle diameter												Coarse fragments			
	Total			Sand					Sand	Very		Textural class				
	Sand	Silt	Clay	Very	Coarse	Medium	Fine	Very	coarser	fine sand			>2	2-19	19-76	
	(2- 0.05 mm)	(0.05- 0.002 mm)	(>0.002 mm)	coarse (2.0- 1.0 mm)	(1.0- 0.5 mm)	(0.5- 0.25 mm)	(0.25- 0.1 mm)	fine (0.1- 0.05 mm)	than very fine (2.0-0.1 mm)	plus silt (0.1- 0.002 mm)			mm	mm	mm	
	----- Pct <2 mm -----													Pct	Pct	Pct
Berks very channery silt loam*:																
(86KY-069-5)																
A-----0 to 4	23.5	60.9	15.6	3.6	2.8	2.2	4.3	10.6	12.9	71.5	sil	62	18	44		
Bw1-----4 to 13	25.8	59.3	14.9	7.5	2.6	0.9	1.9	12.9	12.9	72.2	sil	45	22	23		
Bw2-----13 to 19	21.2	63.4	15.4	5.0	1.8	0.6	1.8	12.0	9.2	75.4	sil	54	21	33		
Bw3-----19 to 27	21.6	54.8	23.6	5.7	1.7	0.5	1.2	12.5	9.1	67.3	sil	51	19	32		
2CB-----27 to 33	7.8	50.6	41.6	1.2	1.0	0.4	1.0	4.2	3.6	54.8	sic					
Blairton silt loam:																
(86KY-069-12)																
Ap-----0 to 6	15.3	60.6	24.1	0.9	1.4	1.0	2.1	9.9	5.4	70.5	sil					
Bt1-----6 to 14	22.8	50.6	26.6	4.9	3.4	1.1	1.6	11.8	11.0	62.4	sil					
Bt2-----14 to 18	13.1	55.5	31.4	0.1	0.1	0.1	0.4	12.4	0.7	67.9	sicl					
BC-----18 to 27	14.8	62.7	22.5	0.4	0.5	0.2	0.8	12.9	1.9	75.6	sil					
Cr-----27 to 35	---	---	---	---	---	---	---	---	---	---	---	---	---	---		
McGary silt loam:																
(86KY-069-10)																
Ap-----0 to 8	7.4	74.3	18.3	1.4	2.2	1.2	1.2	1.4	6.0	75.7	sil					
Bt1-----8 to 14	3.2	62.2	34.6	0.4	0.8	0.4	0.6	1.0	2.2	63.2	sicl					
Bt2-----14 to 26	2.6	53.9	43.5	0.1	0.3	0.2	0.5	1.5	1.1	55.4	sic					
Btg-----26 to 39	2.1	44.7	53.2	0.4	0.3	0.2	0.4	0.8	1.3	45.5	sic					
2C-----39 to 48	17.9	38.8	43.3	1.3	0.8	0.7	2.8	12.3	5.6	51.1	c					
2Cr-----48 to 54	---	---	---	---	---	---	---	---	---	---	---	---	---	---		
Muse channery silt loam:																
(85KY-069-16)																
A-----0 to 3	11.2	63.1	25.7	2.9	2.1	1.5	1.0	3.7	7.5	66.8	sil	16	16	---		
Bt1-----3 to 11	8.1	51.5	40.4	0.9	1.5	1.2	1.1	3.4	4.7	54.9	sic	35	34	1		
Bt2-----11 to 20	6.2	35.1	58.7	1.0	1.1	0.8	---	3.3	2.9	38.4	c	28	24	4		
Bt3-----20 to 39	5.2	31.5	63.3	1.2	1.0	0.7	0.7	1.6	3.6	33.1	c	18	13	5		
Bt4-----39 to 46	8.0	35.1	56.9	1.1	1.6	1.2	1.2	2.9	5.1	38.0	sic	18	14	4		
2C-----46 to 59	5.0	40.7	54.3	0.5	0.9	0.8	---	2.8	2.2	43.5	sic	26	18	8		
2R-----59	---	---	---	---	---	---	---	---	---	---	---	---	---	---		

See footnotes at end of table.

TABLE 17.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name, report number, horizon, and depth in inches	Total			Size class and particle diameter								Coarse fragments					
				Sand				Sand							Very		
	Sand	Silt	Clay	Very	Coarse	Medium	Fine	Very	coarser	fine sand	Textural	>2 mm	2-19 mm	19-76 mm			
	(2- 0.05 mm)	(0.05- 0.002 mm)	(>0.002 mm)	coarse (2.0- 1.0 mm)	(1.0- 0.5 mm)	(0.5- 0.25 mm)	(0.25- 0.1 mm)	fine (0.1- 0.05 mm)	than very fine (2.0-0.1 mm)	plus silt (0.1- 0.002 mm)	class						
----- Pct <2 mm -----															Pct	Pct	Pct
Shrouts silty clay:																	
(86KY-069-11)																	
Ap-----0 to 4	12.0	43.5	44.5	1.2	3.2	2.2	3.3	2.1	9.9	45.6	sic						
Bt-----4 to 7	3.5	42.3	54.2	0.6	0.8	0.5	0.8	0.8	2.7	43.1	sic						
Btk1-----7 to 16	5.1	27.4	67.5	0.8	0.6	0.3	1.1	2.3	2.8	29.7	c						
Btk2-----16 to 27	17.2	20.8	62.0	1.2	0.7	0.5	2.3	12.5	4.7	33.3	c						
Ck-----27 to 35	28.7	14.7	56.6	1.3	2.3	1.4	6.7	17.0	11.7	31.7	c						
Cr-----35 to 40	---	---	---	---	---	---	---	---	---	---	---	---	---	---			
Trappist silt																	
loam**:																	
(85KY-069-14)																	
A-----0 to 2	20.4	48.4	31.2	4.6	5.8	4.2	3.3	2.5	17.9	50.9	cl	10	10	---			
Bt1-----2 to 20	1.3	18.8	79.9	0.2	0.3	0.3	0.3	0.2	1.1	19.0	c	21	8	13			
Bt2-----20 to 26	1.0	21.4	77.6	---	0.2	0.3	0.3	0.2	0.8	21.6	c	10	3	7			
C/R-----26 to 35	15.1	39.7	45.2	4.8	4.5	2.7	1.9	1.2	13.9	40.9	c	77	64	13			
Wharton silt loam:																	
(86KY-069-6)																	
A-----0 to 5	22.9	61.9	15.2	4.3	2.0	0.9	2.0	13.7	9.2	75.6	sil						
Bt1-----5 to 14	13.6	54.7	31.7	1.7	0.8	0.5	1.4	9.2	4.4	63.9	sicl						
Bt2-----14 to 19	11.0	59.9	29.1	0.8	0.4	0.2	0.4	9.2	1.8	69.1	sicl						
Bt3-----19 to 34	12.4	60.3	27.3	0.9	0.6	0.4	1.3	9.2	3.2	69.5	sicl						
BC-----34 to 41	11.5	63.2	25.3	0.5	0.4	0.2	1.0	9.4	2.1	72.6	sil						
Cr-----41 to 46	---	---	---	---	---	---	---	---	---	---	---	---	---	---			

* The 2CB horizon has more clay and fewer rock fragments than is defined as the range for the series. These differences do not significantly affect use and management.

** Location of the pedon is about 1 mile north of Wallingford, 225 yards north of an old house site and 200 yards west of a dirt road. This pedon is outside the range in characteristics that defines the series because it has an A horizon of clay loam and has hue of 2.5YR in the Bt2 horizon. These differences do not significantly affect use and management.

TABLE 18.--CHEMICAL ANALYSES OF SELECTED SOILS

(A dash indicates that the material was not detected. A blank indicates that a determination was not made. The pedons for the soils listed are typical of the series in the county. For the location of the pedons, see the section "Soil Series and Their Morphology." The analyses were made by the Kentucky Agricultural Experiment Station)

Soil name, report number, horizon, and depth in inches	pH		Extractable cations					Cation-exchange capacity			Hydrogen plus aluminum	Base saturation		Organic matter	Cal- cium car- bonate equiv- alent	Phos- phorus	Potas- sium	
	H ₂ O	KCl 1N	Ca	Mg	K	Na	Total (TEC)	Ammo- nium acetate	Sum of cations	Extract- able acidity		Ammo- nium acetate	Sum of cations					
	1:1	1:1																
-----Milliequivalents per 100 grams of soil-----													Pct	Pct	Pct	Pct	p/m	p/m
Berks very channery silt loam: (86KY-069-5)																		
A-----0 to 4	4.3		1.4	0.5	0.2	0.1	2.2	14.2	17.3	15.1		16	13	4.2	---	10	112	
Bw1---4 to 13	5.3		0.5	0.5	0.2	0.1	1.3	10.0	9.6	8.3		13	14	0.8	---	6	107	
Bw2---13 to 19	5.1		1.0	0.8	0.1	0.1	2.0	10.0	9.2	7.2		20	22	0.9	---	6	103	
Bw3---19 to 27	5.0		1.0	1.5	0.1	0.1	2.7	10.2	12.7	10.0		27	21	0.5	---	6	111	
2CB---27 to 33	4.9		0.9	4.5	0.2	0.1	5.7	10.7	19.6	13.9		53	29	0.6	---	6	143	
Blairton silt loam: (86KY-069-12)																		
Ap-----0 to 6	5.3		7.4	0.8	0.2	0.3	8.7	17.0	13.7	5.0		51	64	3.5	---	9	128	
Bt1-----6 to 14	5.1		3.1	1.3	0.2	0.3	4.9	16.7	15.1	10.2		29	33	0.9	---	5	150	
Bt2-----14 to 18	4.8		1.3	1.8	0.3	0.3	3.7	19.4	15.7	12.0		19	24	0.6	---	4	168	
BC-----18 to 27	4.7		0.5	1.9	0.3	0.3	3.0	16.7	14.7	11.7		18	20	0.4	---	6	185	
Cr-----27 to 35	---		---	---	---	---	---	---	---	---		---	---	---	---	---	---	
McGary silt loam*: (86KY-069-10)																		
Ap-----0 to 8	6.6		9.1	1.6	0.2	0.1	11.0	17.7	13.9	2.9		62	79	2.1	0.2	15	94	
Bt1-----8 to 14	5.4		9.7	5.5	0.2	0.2	15.6	21.1	23.2	7.6		74	67	0.7	---	4	161	
Bt2-----14 to 26	5.1		9.9	11.5	0.4	0.2	22.0	28.0	31.2	9.2		79	71	0.6	---	4	264	
Btg---26 to 39	7.3		12.5	14.9	0.3	0.2	27.9	24.6	29.1	1.2		113	96	0.5	0.3	4	213	
2C-----39 to 48	8.1		18.5	10.2	0.2	0.2	29.1	20.0	29.1	---		146	100	0.6	44.9	4	150	
2Cr-----48 to 54	---		---	---	---	---	---	---	---	---		---	---	---	---	---	---	
Muse channery silt loam: (85KY-069-16)																		
A-----0 to 3	5.2	4.6	11.9	3.4	0.6	---	15.9	18.8	28.8	12.9	---	85	55	3.9				
Bt1---3 to 11	4.8	3.9	3.2	2.2	0.5	---	5.9	13.5	17.0	11.1	1.8	44	35	1.1				
Bt2---11 to 20	4.6	3.5	2.9	2.6	0.6	---	6.1	18.2	21.9	15.8	6.7	34	28	0.7				
Bt3---20 to 39	4.4	3.4	0.7	1.1	0.5	---	2.3	19.5	23.0	20.7	12.1	12	10	0.5				
Bt4---39 to 46	4.4	3.4	0.3	0.9	0.4	---	1.6	18.8	22.6	21.0	13.1	9	7	0.3				
2C---46 to 59	4.3	3.3	0.2	0.8	0.4	---	1.4	18.6	23.2	21.8	12.4	8	6	0.4				
2R---59	---	---	---	---	---	---	---	---	---	---	---	---	---	---				

See footnotes at end of table

TABLE 18.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name, report number, horizon, and depth in inches	pH		Extractable cations					Cation-exchange capacity			Extract- able acidity	Hydrogen plus aluminum	Base saturation		Organic matter	Cal- cium car- bonate equiv- alent	Phos- phorus	Potas- sium
	H ₂ O	KCl	Ca	Mg	K	Na	Total	Ammo- nium	Sum of	Ammo- nium			Sum of					
	1:1	1N					(TEC)	acetate	cations	acetate			cations					
			-----Milliequivalents per 100 grams of soil-----										Pct	Pct	Pct	Pct	p/m	p/m
Shrouds silty clay (86KY-069-11)																		
Ap-----0 to 4	7.4		12.4	13.1	0.3	0.1	25.9	29.5	26.4	0.5		88	98	8.1	4.5	5	288	
Bt-----4 to 7	7.5		12.2	12.7	0.3	0.2	25.4	25.1	25.7	0.3		101	99	2.2	0.5	4	192	
Btk1----7 to 16	7.6		13.9	13.5	0.2	0.3	27.9	18.9	27.9	---		148	100	1.0	17.6	4	139	
Btk2---16 to 27	7.9		16.5	13.4	0.2	0.3	30.4	15.2	34.9	4.5		200	87	0.6	32.0	4	114	
Ck-----27 to 35	7.9		15.1	12.9	0.2	0.3	28.5	13.2	28.5	---		216	100	0.5	37.6	4	106	
Trappist silt loam**: (85KY-069-14)																		
A-----0 to 2	4.0	3.5	11.7	2.3	0.6	---	14.6	33.7	42.1	27.5	2.3	43	35	8.2				
Bt1----2 to 20	4.1	3.2	---	0.7	0.7	---	1.4	22.4	25.8	24.4	13.9	6	5	1.0				
Bt2---20 to 26	3.8	3.1	0.3	1.1	0.6	---	2.0	21.6	24.8	22.8	13.5	9	8	0.6				
C/R---26 to 35	3.9	3.2	0.7	1.1	0.3	---	2.1	16.4	16.7	14.6	7.6	13	13	0.7				
Wharton silt loam: (86KY-069-6)																		
A-----0 to 5	4.8		0.3	0.3	0.2	0.1	0.9	12.4	17.0	16.1		7	5	2.7	---	7	97	
Bt1----5 to 14	5.0		0.2	0.5	0.2	0.1	1.0	12.6	12.5	11.5		8	8	1.0	---	5	105	
Bt2----14 to 19	4.9		0.1	2.4	0.2	0.1	2.8	14.0	15.9	13.1		20	18	0.5	---	5	142	
Bt3----19 to 34	4.9		0.2	3.4	0.2	0.1	3.9	13.2	16.3	12.4		30	24	0.4	---	5	156	
BC----34 to 41	5.1		0.8	4.2	0.2	0.1	5.3	14.0	15.5	10.2		38	34	0.5	---	5	168	
Cr-----41 to 46	---		---	---	---	---	---	---	---	---		---	---	---	---			

* The Bt1 and Bt2 horizons are slightly more acid than is defined as the range for the series. This difference does not significantly affect use and management.

** Location of the pedon is about 1 mile north of Wallingford, 225 yards north of an old house site and 200 yards west of a dirt road.

TABLE 19.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Allegheny-----	Fine-loamy, mixed, mesic Typic Hapludults
Beasley-----	Fine, mixed, mesic Typic HapludalFs
Berks-----	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Blairton-----	Fine-loamy, mixed, mesic Aquic Hapludults
Boonesboro-----	Fine-loamy, mixed, mesic Fluventic Hapludolls
Brownsville-----	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Colyer-----	Clayey-skeletal, mixed, mesic Lithic Dystrochrepts
Crider-----	Fine-silty, mixed, mesic Typic PaleudalFs
Cynthiana-----	Clayey, mixed, mesic Lithic HapludalFs
Eden-----	Fine, mixed, mesic Typic HapludalFs
Elk-----	Fine-silty, mixed, mesic Ultic HapludalFs
Fairmount-----	Clayey, mixed, mesic Lithic Hapludolls
Faywood-----	Fine, mixed, mesic Typic HapludalFs
Lawrence-----	Fine-silty, mixed, mesic Aquic FragiudalFs
Lowell-----	Fine, mixed, mesic Typic HapludalFs
McGary-----	Fine, mixed, mesic Aeric OchraqualFs
Melvin-----	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Monongahela-----	Fine-loamy, mixed, mesic Typic Fragiudults
Morehead-----	Fine-silty, mixed, mesic Aquic Hapludults
Muse-----	Clayey, mixed, mesic Typic Hapludults
Newark-----	Fine-silty, mixed, nonacid, mesic Aeric Fluvaquents
Nicholson-----	Fine-silty, mixed, mesic Typic FragiudalFs
Nolin-----	Fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts
Otwell-----	Fine-silty, mixed, mesic Typic FragiudalFs
Sandview-----	Fine-silty, mixed, mesic Typic HapludalFs
Shelocta-----	Fine-loamy, mixed, mesic Typic Hapludults
Shrouts-----	Fine, mixed, mesic Typic HapludalFs
Skidmore-----	Loamy-skeletal, mixed, mesic Dystric Fluventic Eutrochrepts
Tilsit-----	Fine-silty, mixed, mesic Typic Fragiudults
Trappist-----	Clayey, mixed, mesic Typic Hapludults
Wharton-----	Fine-loamy, mixed, mesic Aquic Hapludults
Woolper-----	Fine, mixed, mesic Typic Argiudolls

TABLE 20.--GEOLOGIC SYSTEMS, FORMATIONS, AND MEMBERS

System	Formation	Member	Dominant soils
Quaternary-----	---	Alluvium	Boonesboro, Elk, Newark, Nolin, Otwell, Skidmore, Woolper
Tertiary and Quaternary-----	---	High-level fluvial deposits	Allegheny, Elk, Monongahela
Pennsylvanian---	Lee	---	Berks
Mississippian---	Borden	Cowbell	Berks, Brownsville
		Nancy	Blairton, Shelocta, Tilsit, Wharton
		Farmers	Berks, Brownsville, Shelocta
Devonian or Mississippian--	Sunbury and Bedford Shale	---	Colyer, Trappist
Devonian-----	Ohio Shale	---	Colyer, Muse, Trappist
Silurian-----	Bisher Limestone	---	---
	Upper Crab Orchard	---	Beasley, Lawrence, McGary, Nicholson, Shrouds
	Lower Crab Orchard	---	Beasley, Crider, Nicholson, Sandview

TABLE 20 --GEOLOGIC SYSTEMS, FORMATIONS, AND MEMBERS--Continued

System	Formation	Member	Dominant soils
Ordovician-----	Drakes	Preachersville	Beasley, Shrouts
	Bull Fork	---	Cynthiana, Fairmount, Faywood, Lowell, Nicholson, Sandview, Woolper
	Grant Lake	---	Cynthiana, Fairmount, Faywood, Lowell, Nicholson, Woolper
	Fairview	---	Fairmount, Woolper
	Kope	---	Eden, Fairmount, Woolper
	Clays Ferry	---	Eden
	Tanglewood	---	Eden

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